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(Assessment of) NONPOINT SOURCE POLLUTION For The State Of SOUTH CAROLINA

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S.C. Coastal Management Program

ASSESSMENT OF NONPOINT SOURCE POLLUTION

STATE OF SOUTH CAROLINA

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

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Prepared by

Bureau of Water Pollution Control

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EXECUTIVE SUMMARY

This report summarizes existing data concerning nonpoint source impacted waters within the State of South Carolina. It was prepared by the South Carolina Department of Health and Environmental Control in compliance with Section 319 of the Clean Water Act of 1987. Generally, the Assessment is a list of waters, including surface and groundwaters, impacted by Nonpoint Source (NPS) runoff and the NPS category, or source, contributing to these impacts. The surface water list and accompanying information are shown in Table A and the groundwater list in Table B. More than 330 surface waterbodies or portions of waterbodies are estimated to be impacted by NPS pollution. Recent analysis has shown that 8 percent of the State's flowing streams mileage, 9 percent of the coastal saltwater acreage, and less than 1 percent of the lakes' acreage are not attaining their State classified uses due to nonpoint source pollution. The greatest categorical contributor to surface water NPS is agriculture, with urban runoff following. The groundwater inventory lists 200 incidents of groundwater contamination caused by NPS sources with leaking lagoons, ponds, pits, or tanks mentioned as the most numerous category. The report also addresses such subjects as data gaps, high quality waters, wetlands, and antidegradation.

The NPS Assessment is a component of a four year program specified in Section 319. It includes assessment, a Management Program that describes best management practices and the programs to implement them, and the actual implementation of the programs using a combination of federal, State, and local funds. Chapters seven and eight describe the process for selecting the best management practices and summarizes the existing regulatory and non-regulatory programs currently being implemented by agencies in the State to control NPS pollution.

Chapter ten describes the public participation process used during Assessment development. Section 319 specifies that other groups with water quality and resource interests be actively involved in the process of identifying NPS water quality problem areas, identifying the sources impacting these waters, and identifying the best management practices (BMPs). The Law also requires that the State issue a public notice on the availability of the Assessment Report for public review and provide an opportunity for public comment prior to submitting the Report to the Environmental Protection Agency.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

Nonpoint source (NPS) pollution in South Carolina may be described as pollution contained in stormwater runoff from land surfaces. The pollution can impact the State's surface and groundwaters. It emanates from diffuse sources in contrast to "point source" pollution which is discharged from a pipe into a waterbody. Typical examples of sources which contribute to nonpoint source pollution include runoff from agricultural land, urban areas, construction sites, logging roads, failing individual sewage treatment and disposal systems, abandoned mines, etc. The most common NPS pollutants include sediment, nutrients, and fecal coliform bacteria.

Historically, emphasis for pollution control has been on regulation of point sources; however, recent legislation has renewed emphasis on addressing nonpoint source pollution control as an effective measure to improve and protect water quality. The Clean Water Act (CWA) of 1987 reauthorized a similar law which was passed in 1977. One of the main differences between these Acts is the emphasis the 1987 CWA puts on nonpoint source pollution control as well as conventional point source control. According to Section 319 of the CWA, each state must develop strategies for managing nonpoint source pollution. In South Carolina, the S. C. Department of Health and Environmental Control (DHEC), has been designated lead agency for nonpoint source pollution management activities. Two reports must be prepared and submitted to the U. S. Environmental Protection Agency: a Nonpoint Source Assessment and a Nonpoint Source Management Program.

The first of these reports, the Nonpoint Source Assessment includes the following items:

1. A list of navigable waters which, without additional actions to control nonpoint source pollution, cannot be expected to support their designated uses. These waters include those which partially or do not support their designated uses because of nonpoint source pollution. In addition, waterbodies of high quality are included as being potentially impacted if effective nonpoint source controls are not implemented.
2. For each waterbody impacted by nonpoint source pollution, an identification of the source(s) (e.g., agriculture, urban, etc.) of such pollution.
3. A description of the process, including intergovermental and public participation, by which BMPs are identified and selected.
4. An identification and list of State and local programs for controlling nonpoint source pollution.

This report addresses those four subjects.

Protection of existing waterbody uses and maintaining water quality to support those uses is the objective of DHEC and the aim of the CWA Nonpoint Source Management Program. Further degradation of waterbodies by either point or nonpoint sources of pollution allow further degradation of waterbodies by either point or nonpoint sources of pollution. If nonpoint sources of pollution are inhibiting any of the State's waters from being used for their intended designation, then controls must be implemented to prevent further degradation. Most point source control strategies are integrated with the assimilative capacity of the waterbody. In other words, how much waste can the stream assimilate without degrading water quality to the extent that aquatic life is impacted or a use is no longer attainable? In contrast, nonpoint source control strategies are based on installation and implementation of best management practices (BMPs). Each BMP is based on a particular technology which (in theory) should protect the designated uses of the waterbody.

In assessing statewide NPS impacted waterbodies, several sources of data and information were utilized. Monitored data from the Department's network surface water trend sampling network was examined. Information regarding locations of NPS impacted waterbodies was solicited from other agencies, groups, and individuals. Information on potentially impacted waterbodies was analyzed using a computer model.

NPS assessment is expected to be a continuing effort. Over the four-year period, updated information will be gathered, assessed, and reported in the annual NPS program reports. This information will also in incorporated into the State's <u>Water Quality Assessment</u> (305b Report).

CHAPTER 1

RESULTS OF SURFACE WATER ASSESSMENT

Table A presents the general results of the surface water NPS Assessment. An explanation of the abbreviations used can be found in the legend that precedes the table. Various columns in the table include: watershed, waterbody, county, monitoring station number, NPS category, parameters of concern, data source, standard violations, and additional comments. The legend also gives an explanation of the data type contained in each of the columns of the table. Table A is arranged by watershed according to EPA guidance. The watershed identifier is the standardized federal eight digit hydrologic unit code as shown in Figure 1. The code represents region, subregion, accounting unit, and cataloging unit. The smallest watershed unit that is depicted in Figure 1 was not employed in Table A.

A total of 336 waterbodies were identified as NPS pollution problem areas. Data from DHEC's surface water quality sampling network was utilized in identifying 71 percent of these areas. Additional sources of data included: DHEC Environmental Quality Control Districts, interested public, S.C. Land Resources Conservation Commission computer modelling, <u>S.C. Water Quality Assessment 1984-1985</u> [305(b) Report], <u>America's Clean Water, the State's Nonpoint Source Assessment 1985, Appendix</u>, and the <u>National Estuarine Inventory - National Coastal Pollution Discharge Inventory</u>. Column 7 in Table A lists the specific data source for each identified waterbody.

The data collected from DHEC's surface water quality sampling network was considered to be "monitored," and all other data "evaluated." Of the 336 probable NPS problem areas listed, 35 percent were solely based on monitored

LEGEND FOR TABLE A

Column 1 - Watershed

The standard federal eight digit hydrologic unit was selected as the watershed designation for the assessment.

Column 2 - Waterbody

The name of the body of water, i.e., stream, river, lake, wetland, etc. that evidences real or potential adverse impacts due to NPS contributions.

Column 3 - County

The South Carolina county or counties in which the problem waterbody lies. Along with the watershed identifier, it defines the location of the waterbody.

Column 4 - Station #

The DHEC surface water quality sampling station identification number.

Column 5 - NPS Category

NPS Category represents the source of pollution affecting the problem waterbody. Category number designations are taken directly from EPA guidance:

- 11 - Agriculture: Non-irrigated crop production
- 12 - Agriculture: Irrigated crop production
- 13 - Agriculture: Specialty crop production
- 14 - Agriculture: Pastureland
- 18 - Agriculture: Animal holding/management
- 21 - Silviculture: Harvesting, reforestration, residue management
- 31 - Construction: Highway/road/bridge
- 32 - Construction: Land development
- 41 - Urban Runoff: Storm sewers
- 43 - Urban Runoff: Surface runoff
- 58- Resource Extraction: Abandoned gravel, sand, and clay mines
- 65 - Land Disposal: Individual sewage treatment and disposal systems
- 71 - Hydrologic/Habitatal Modification: Channelization
- 80 - Other
- 90 - Source Unknown

Column 6 - Parameters of Concern

The specific water quality indicators of NPS pollution. The waterbodies listed have exhibited exceedences of specific guidelines or standards of one or more of the parameters shown:

FC - Fecal Coliform Bacteria
DO - Dissolved Oxygen
TX - Toxic materials such as heavy metals or pesticides
SS - Suspended Solids
NT - Nutrients (phosphorus and/or nitrogen)
pH
TB - Turbidity
BO - Biological Oxygen Demand (BOD_5)
AM - Ammonia

An S in a parameter column indicates scattered exceedences of a particular parameter, N indicates numerous exceedences, and U indicates undetermined.

Column 7 - Data Source

Several sources were utilized to identify NPS problem waterbodies for purposes of the assessment:

I - DHEC's surface water quality sampling network of 543 stations. This data was retrieved form the STORET network.

II - Problem locations supplied by DHEC District Engineers.

III - Problem locations supplied by the interested public including environmental groups and water based recreation groups, etc., such as USDA Soil Conservation Service Conservation, Soil Conservation Districts, S. C. Coastal Council, S. C. Wildlife and Marine Resources Department.

IV - Computer modelling results by S.C. Land Resources Conservation Commission indicate high potential for NPS problems in the agriculture, urban runoff, or surface mining categories.

V - S.C. Water Quality Assessment 1984-1985 [305(b) Report].

VI - Data contained in America's Clean Water, the State's Nonpoint Source Assessment 1985 Appendix produced by ASIWPCA.

VII - Data contained in the National Estuarine Inventory - National Coastal Pollution Discharge Inventory by the National Oceanic and Atmospheric Administration.

Column 8 - Monitored/Evaluated

This denotes whether a problem waterbody was selected based on monitored or evaluated data.

Column 9 - Standards Violations

The State of South Carolina has set water quality standards for three of the parameters listed in the assessment; dissolved oxygen, fecal coliform bacteria, and pH. This column denotes at which waterbody one or more of these parameters had standards violations. For purposes of this Assessment, measurements of the three parameters were summed for the last two-year period of record. If 50 percent or more of the measurements exceeded the criteria of the parameter for the classification of the waterbody it was considered to be in violation of State Water Quality Standards.

Column 10 - Additional Comments

Self-explanatory.

TABLE A
SOUTH CAROLINA WATERBODIES IMPACTED BY NPS POLLUTION

NONPOINT SOURCE ASSESSMENT

WATERSHED	WATERBODY	COUNTY	STATION #	NPS CATEGORY	FC	DO	TX	SS	NT	pH	TB	BO	AM	DATA SOURCE	MONITORED/ EVALUATED	STDS. VIO.	ADDITIONAL COMMENTS
03040201	BIG SWAMP	FLORENCE	PD-168	11	S	N			N		S	S		I	M	DO	
03040201	BLACK CREEK	DARLINGTON	PD-021	11,41,43			S		S	N			N	I,III,IV	M,E		
03040201	BLACK CREEK	DARLINGTON	PD-025	11			S		N				N	I,IV	M,E		ALSO PT SOURCE
03040201	CATFISH CANAL	MARION	PD-321	11,41,43	S	S			N	S				I,IV	M,E		
03040201	CATFISH CANAL	MARION	PD-097	11,41,43		N			N	S				I,IV	M,E	DO	
03040201	CROOKED CREEK	MARLBORO	PD-107	11,41,43	S				N	N				I,IV	M,E	pH	
03040201	JEFFRIES CREEK	FLORENCE	PD-256	11,58		N			N					I,III,IV	M,E	DO	
03040201	JEFFRIES CREEK	DARLINGTON	PD-255	11		N			N					I	M	DO	
03040201	LAKE ROBINSON	DARLINGTON	PD-266	11					N	N				I,IV	M,E	pH	
03040201	LYNCHES LAKE	FLORENCE	PD-086A	11,41,43		N			N	S		S		I	M	DO	ALSO PT SOURCE
03040201	MIDDLE SWAMP	FLORENCE	PD-230	11		N			N				S	I	M		
03040201	PEE DEE RIVER	FLORENCE	PD-076	11			S		S		S		N	I,III,IV	M,E		
03040201	PEE DEE RIVER	DARLINGTON	PD-028	11,13			S		S		S		N	I	M		
03040201	PEE DEE RIVER	MARLBORO	PD-015	11,12					N		N			I,IV	M,E		
03040201	PEE DEE RIVER	MARLBORO	PD-012	11,12			S		S		S		N	I,III	M,E		
03040201	PEE DEE RIVER	FLORENCE	PD-236	11					N		S		S	I,IV	M,E		
03040201	PRESTWOOD LAKE	DARLINGTON	PD-268	41,43					N	N				I	M	pH	
03040201	SNAKE BRANCH	DARLINGTON	PD-258	41,43	S	S			N		S	S		I	M		
03040201	SNAKE BRANCH	DARLINGTON	PD-137	41,43					N					I	M		
03040201	THOMPSON CREEK	CHESTERFIELD		11				U			U			III,IV	E		
03040201	THREE CREEKS	MARLBORO		11,21,31				U	U					III	E		
03040202	BIG SWAMP	FLORENCE	PD-169	11	S	N			N	S		S		I	M		ALSO PT SOURCE
03040202	LICK CREEK	LANCASTER	PD-329	11,14	N									I	M		
03040202	LITTLE FORK CREEK	CHESTERFIELD	PD-215	11	N									I	M		
03040202	LITTLE LYNCHES RIVER	LANCASTER	PD-006	11	N		S		S			S	N	I	M		
03040202	LITTLE RIVER	HORRY	MD-162	41,43			S				S		N	I,III	M,E		
03040202	LYNCHES LAKE	FLORENCE	PD-087	11		N			N	S				I,VI	M,E	DO,pH	
03040202	LYNCHES LAKE	FLORENCE	PD-085	11,41,43		N			N	S		S		I	M	DO	
03040202	LYNCHES RIVER	LEE		11,41,43	U	U	U	U			U			III	E		
03040202	LYNCHES RIVER	FLORENCE	PD-041	11			S						N	I,IV	M,E		
03040202	LYNCHES RIVER	KERSHAW	PD-080	11	S		S		S		S		N	I	M		
03040202	LYNCHES RIVER	FLORENCE	PD-281	11			S						N	I,IV	M,E		
03040202	LYNCHES RIVER	CHESTERFIELD	PD-113	11	N				N				N	I,IV,V	M,E		
03040202	LYNCHES RIVER	KERSHAW	PD-009	11	S				N					I	M		
03040202	LYNCHES RIVER	KERSHAW	PD-066	11	S				N					I,III	M,E		
03040202	S BR WILDCAT CREEK	LANCASTER	PD-180	14	N				N					I	M		
03040202	SPARROW SWAMP	DARLINGTON	PD-072	11		N			N	S				I,III,IV	M,E	DO,pH	
03040202	TODD BRANCH	LANCASTER	PD-005	41,43	N				N		S			I	M	FC	
03040202	W BR WILDCAT CREEK	LANCASTER	PD-179	14	N				N					I	M		
03040204	BEAVERDAM CREEK	DILLON	PD-310	11		N			N	N		S		I	M	DO,pH	
03040204	CHINNERS MILL BRANCH	HORRY	PD-177	11		N								I	M		
03040204	LAKE SWAMP	HORRY	PD-176	11,18		N			N	S		S		I,IV	M,E		
03040204	LITTLE PEE DEE RIVER	MARION	PD-189	11		S	S		N	S			N	I,IV	M,E		

TABLE A (Continued)

NONPOINT SOURCE ASSESSMENT

WATERSHED	WATERBODY	COUNTY	STATION #	NPS CATEGORY	PARAMETERS OF CONCERN: FC	DO	TX	SS	NT	pH	TB	BO	AM	DATA SOURCE	MONITORED/ EVALUATED	STDS. VIO.	ADDITIONAL COMMENTS
03040204	LITTLE PEE DEE RIVER	DILLON	PD-069	11,21					N	N			S	I,III,IV,VI	M,E	pH	
03040204	LITTLE PEE DEE RIVER	MARION	PD-053	11			S		N	S			S	I,III,IV	M,E		
03040204	LITTLE PEE DEE RIVER	DILLON	PD-029E	11					N	N				I,III,IV	M,E		
03040204	MAIDEN DOWN SWAMP	MARION	PD-190	11		N			N					I	M	DO	
03040204	McLAURENS MILL POND	MARLBORO	PD-17A	11		N								I	M		
03040204	PANTHER CREEK	MARLBORO	PD-306	11		N			N	N				I	M		
03040205	BIRCH CREEK	WILLIAMSBURG	PD-213	11,18	S	S			N					I	M		
03040205	BLACK MINGO CREEK	GEORGETOWN	PD-172	11		S	S		N					I	M	DO	
03040205	BLACK RIVER	LEE	PD-186	11,41,43	S	S	U	U	N	S	U			I,III	M,E		
03040205	GREEN SWAMP	SUMTER	PD-039	11,41,43	S	S								I	M		
03040205	POCOTALIGO RIVER	SUMTER	PD-091	11,41,43	S	S	S		N				N	I	M		ALSO PT SOURCE
03040205	POCOTALIGO RIVER	CLARENDON	PD-115	11		N			N	S				I	M	DO	
03040205	POCOTALIGO RIVER	SUMTER	PD-202	11,41,43		N	S		N	S			N	I	M	DO,pH	ALSO PT SOURCE
03040205	PUDDING SWAMP	WILLIAMSBURG	PD-203	11		S			N	S				I,IV	M,E		
03040205	ROCKY BLUFF SWAMP	SUMTER	PD-201	11		S			N	N				I	M	FC,DO,pH	
03040205	SCAPE ORE SWAMP	LEE		11,43	U	U	U	U			U			III,IV	E		
03040205	TURKEY CREEK	SUMTER	PD-098	11,41,43	N	S			N		S	S		I	M	FC	
03040206	CRABTREE CREEK	HORRY	MD-158	11,41,43		N			N		S			I	M	FC,DO	
03040206	INTRACOASTAL WATERWAY	HORRY	MD-085	41,43	S	N			N		S			I,II,VI	M,E		
03040206	INTRACOASTAL WATERWAY	HORRY	MD-088	41,43	S	N								I	M	FC	
03040206	INTRACOASTAL WATERWAY	HORRY	MD-087	41,43	S	N				S				I	M	FC	
03040206	INTRACOASTAL WATERWAY	HORRY	MD-127	41,43		N	S			S			S	I	M		
03040206	INTRACOASTAL WATERWAY	HORRY	MD-089	41,43	S	N				S				I	M		
03040206	KINGSTON LAKE	HORRY	MD-107	41,43	N	N			N	S				I	M	FC,DO,pH	
03040206	WACCAMAW RIVER	HORRY	MD-136	11,18,43		N				S				I	M		
03040206	WACCAMAW RIVER	HORRY	MD-111	11,18,43		N			N	S				I	M	pH	
03040206	WACCAMAW RIVER	HORRY	MD-110	11,18,43		N			N	S				I,III,VI	M,E		
03040207	ATL SURF-CMB OUTFALLS	HORRY		41,43										III	E		81 OUTFALLS
03040207	ATL SURF-NMB 27 AVE S	HORRY		41,43										III	E		
03040207	ATL SURF-NMB 7 AVE S	HORRY		41,43										III	E		
03040207	ATL SURF-NMB MAIN STREET	HORRY		41,43										III	E		
03040207	ATL SURF-SURFSIDE 5 AVE S	HORRY		41,43										III	E		
03040207	ATL SURF-SURFSIDE 7 AVE N	HORRY		41,43										III	E		
03040207	CANE PATCH SWASH-ATL SURF	HORRY		41,43										III	E		
03040207	HOG INLET	HORRY		41,43,71	U									III	E		3 CANALS
03040207	INTRACOASTAL WATERWAY	HORRY	MD-091	11,41,43	S	N					S			I	M	FC	
03040207	LITTLE R INLET-DUNN SOUND	HORRY		90	U									III	E		SHELLFISH PROHB
03040207	MIDWAY INLET INTERIOR	GEORGETOWN		41,43,65	U									III	E		SHELLFISH PROHB
03040207	MURRELLS INLET	GEORGETOWN		41,43,71										III	E		MARINAS
03040207	NORTH INLET	GEORGETOWN		41,43,71										III	E		DEBIDUE CANALS
03040207	PAWLEYS INLET INTERIOR	GEORGETOWN		41,43,65	U									III	E		
03040207	SAMPIT RIVER	GEORGETOWN		41,43,65	U		U	U						III	E		ALSO PT SOURCE
03040207	SINGLETON SWASH	HORRY		41,43,80										III	E		GOLF RUNOFF

TABLE A (Continued)

NONPOINT SOURCE ASSESSMENT

WATERSHED	WATERBODY	COUNTY	STATION #	NPS CATEGORY	PARAMETERS OF CONCERN FC	DO	TX	SS	NT	pH	TB	BO	AM	DATA SOURCE	MONITORED/ EVALUATED	STDS. VIO.	ADDITIONAL COMMENTS
03040207	TURKEY CREEK	GEORGETOWN	MD-076N	11						S				I	M		
03040207	WHITE POINT SWASH	HORRY		41,43										III	E		
03040207	WINYAH BAY	GEORGETOWN		11					U					VII	E		
03040207	WITHERS SWASH-ATL SURF	HORRY		41,43										III	E		
03050101	BEAVERDAM CREEK	YORK	CW-153	14	N				N		S			I,IV	M,E		
03050101	CROWDERS CREEK	YORK	CW-023	11,14	N		S		N		N	S		I	M	FC	ALSO PT SOURCE
03050101	LAKE WYLIE	YORK		11,65	U			U						III,IV	E		
03050101	TOOLS FORK CREEK	YORK	CW-212	11	N									I	M		
03050103	BEAR CREEK	LANCASTER	CW-151	11,14	S	S			N		S			I	M		
03050103	BEAR CREEK	LANCASTER	CW-131	41,43	N	S			N		S			I	M		
03050103	CANE CREEK	LANCASTER	CW-185	14,58	S	S			N		S			I,IV	M,E		
03050103	CATAWBA RIVER	YORK		65	U						U			III	E		ALSO PT SOURCE
03050103	FISHING CREEK	YORK	CW-029	11,14			S		S		S		N	I,IV,V,VI	M,E		
03050103	FISHING CREEK	CHESTER	CW-008	11,14			N		N				N	I,IV	M,E		
03050103	FISHING CREEK RESERVOIR	CHESTER	CW-16F	11,14	S									I	M		
03050103	GILLS CREEK	LANCASTER	CW-047	41,43	N	S			N		S			I	M		
03050103	GRASSY RUN BRANCH	CHESTER	CW-088	41,43	N				N		S	S	S	I	M		
03050103	ROCKY CREEK	CHESTER	CW-002	11,14										I,IV	M,E		
03050103	STEEL CREEK	YORK	CW-011	14	N				N		S			I	M		
03050103	STEEL CREEK	YORK	CW-009	14	N	S			N		S	S		I	M		
03050103	TWELVE MILE CREEK	LANCASTER	CW-083	14	S	S			N		N			I	M		
03050103	U. T. TO CATAWBA RIVER	YORK	CW-221	41,43	N				N					I	M	FC	
03050103	WILDCAT CREEK	YORK	CW-006	41,43	N	N								I	M		
03050104	KELLY CREEK	KERSHAW	CW-154	75			N							I	M		AB'D IND. PIT
03050104	LAKE WATEREE	FAIRFIELD	CW-208	11,14		S			N	S	S		S	I,VI	M,E		
03050104	LITTLE WATEREE CREEK	FAIRFIELD	CW-040	14	N				N		S			I	M		
03050104	WATEREE RIVER	KERSHAW,SUMTER		11,14,32			U	U			U			III	E		
03050105	BROAD RIVER	CHEROKEE	B-044	11,13,14	N		S		N		N	S	N	I	M		
03050105	BROAD RIVER	CHEROKEE	B-043	11,13,14	N				N		N			I,IV	M,E		
03050105	BROAD RIVER	CHEROKEE	B-042	11,13,14	N		N		N				N	I,III,VI	M,E		
03050105	BRUSHY CREEK	GREENVILLE	BE-009	41,43	N						N			I	M		
03050105	BULLOCKS CREEK	YORK	B-159	11,14	N				S		S			I,IV	M,E		
03050105	CHEROKEE CREEK	CHEROKEE	B-056	11,14,32	S									I,IV	M,E		
03050105	HEADWATERS OF LAKE BOWEN	SPARTANBURG	B-302	11,13,32							N			I,IV	M,E		
03050105	LAKE WELCHEL	CHEROKEE		11,14,43				U						III	E		
03050105	LAWSONS FORK CREEK	SPARTANBURG		11,32,43	U			U						III,IV	E		ALSO PT SOURCE
03050105	LIMESTONE MILL CREEK	CHEROKEE	B-128	41,43	N									I	M		
03050105	LITTLE BUCK CREEK	SPARTANBURG	B-259	14	S									I	M		
03050105	MIDDLE TYGER RIVER	GREENVILLE	B-148	11	N		N		N		N		N	I	M		
03050105	NORTH PACOLET RIVER	SPARTANBURG	B-026	11,13,32	N		S		N		N		N	I,IV	M,E		
03050105	PACOLET RIVER	SPARTANBURG	BP-001	11,13,32	S				N		S			I,IV	M,E		
03050105	PACOLET RIVER	SPARTANBURG	B-028	11,13,32					N		N			I,IV	M,E		
03050105	POTTER BRANCH	SPARTANBURG	B-191	11,13,14	N				N					I	M		

TABLE A (Continued)

NONPOINT SOURCE ASSESSMENT

WATERSHED	WATERBODY	COUNTY	STATION #	NPS CATEGORY	PARAMETERS OF CONCERN: FC	DO	TX	SS	NT	pH	TB	BO	AM	DATA SOURCE	MONITORED/ EVALUATED	STDS. VIO.	ADDITIONAL COMMENTS
03050105	SPIVEY CREEK	SPARTANBURG	B-103	11,14	N				N		N			I	M		
03050105	THICKETTY CREEK	CHEROKEE	B-062	11,14,32	S				S		S			I,IV	M,E		
03050105	THICKETTY CREEK	CHEROKEE	B-133	11,14,32					N		N			I,IV	M,E		
03050105	TYGER RIVER	SPARTANBURG	B-008	11	N						N		N	I,VI	M,E		ALSO PT SOURCE
03050106	BROAD R DIVERSION CANAL	RICHLAND	B-080	41,43	N		N		N		N		N	I,III	M,E		
03050106	BROAD RIVER	NEWBERRY	B-047	11,14,18	N				N					I	M		
03050106	BROAD RIVER	FAIRFIELD	B-236	11,14			N	S	N		N		N	I	M		
03050106	BROAD RIVER	UNION	B-046	11,14	N		S		N		N	S	N	I	M		
03050106	CRANE CREEK	RICHLAND	B-316	41,43	S									I	M		
03050106	DRY FORK CREEK	CHESTER	B-074	41,43	N				N		N			I	M		
03050106	DRY FORK CREEK	CHESTER	B-073	41,43	N				N		N			I	M		
03050106	JACKSON CREEK	FAIRFIELD		14,32,43				U						III	E		
03050106	LITTLE RIVER	FAIRFIELD	B-145	14,58					N		N			I,IV	M,E		
03050106	MENG CREEK	UNION	B-064	41,43	N									I	M		
03050106	ROSS BRANCH	YORK	B-086	41,43	N				N		N			I	M		
03050106	SANDY RIVER	CHESTER	B-075	11,14,58					N		N			I,IV	M,E		
03050106	SMITH BRANCH	RICHLAND	B-280	41,43	N		N		N		N	N	N	I,V	M,E	FC	
03050106	WINNSBORO BRANCH	FAIRFIELD	B-123	41,43	N				N					I	M	FC	
03050107	ENOREE RIVER	SPARTANBURG	BE-018	11,13,14					N		N			I	M		ALSO PT SOURCE
03050107	ENOREE RIVER	NEWBERRY	B-054	11,13,14	N		N	N	N		N		N	I	M		
03050107	FAIRFOREST CREEK	SPARTANBURG	B-020	14,32,43	N				N					I,IV	M,E	FC	
03050107	KELSEY CREEK	SPARTANBURG	B-235	41,43	N									I	M		
03050107	MITCHELL CREEK	UNION	B-199	14	N				N		N			I	M		
03050107	SOUTH TYGER RIVER	SPARTANBURG	B-263	11,14,43	N				N					I,IV	M,E		ALSO PT SOURCE
03050107	SOUTH TYGER RIVER	GREENVILLE	B-317	14	N				N		N		N	I,IV	M,E		
03050107	TYGER RIVER	SPARTANBURG	B-162	11,14,32	N				N		N	S		I,III,IV	M,E		
03050107	U.T. TO FAIRFOREST CREEK	SPARTANBURG	B-242	41,43					N		N			I	M		
03050108	BEARDS CREEK	LAURENS	B-231	11,14		S								I	M		
03050108	BRUSHY CREEK	GREENVILLE	BE-035	41,43	N				S		S			I	M		
03050108	DURBIN CREEK	GREENVILLE	B-097	11,14	N				N		N			I,IV	M,E		
03050108	ENOREE RIVER	SPARTANBURG	B-037	11,14					N		N			I,III,IV	M,E		ALSO PT SOURCE
03050108	ENOREE RIVER	SPARTANBURG	BE-024	11,14	N				N		N			I,IV	M,E		ALSO PT SOURCE
03050108	ENOREE RIVER	SPARTANBURG	B-041	11,14			N		N		N		N	I,V	M,E		ALSO PT SOURCE
03050108	ENORRE RIVER	GREENVILLE	BE-015	11,14,58					N		N			I,IV	M,E		ALSO PT SOURCE
03050108	GILDER CREEK	GREENVILLE	BE-040	11,14,43	N				S		S			I,IV	M,E		
03050108	HORSE PEN CREEK	GREENVILLE	BE-020	11,13,14	N				N					I	M		ALSO PT SOURCE
03050108	MILL CREEK	SPARTANBURG	B-038	11,14	N	N			N			N		I	M		
03050108	ROCKY CREEK	GREENVILLE	BE-007	41,43	N				N		N	N		I	M		
03050109	BROADMOUTH CREEK	ANDERSON	S-289	11,41,43		S								I,IV	M,E		
03050109	BRUSHY CREEK	ANDERSON	S-067	11,14	N									I	M		
03050109	BRUSHY CREEK	ANDERSON	S-084	11,14	N				N		N			I	M		
03050109	BUSH RIVER	NEWBERRY	S-042	11,14,18	N		S		N		N		N	I,III,IV	M,E		ALSO PT SOURCE
03050109	BUSH RIVER	NEWBERRY	S-102	11,14,18	N				N		N		N	I,IV	M,E		ALSO PT SOURCE

TABLE A (Continued)

NONPOINT SOURCE ASSESSMENT

WATERSHED	WATERBODY	COUNTY	STATION #	NPS CATEGORY	FC	DO	TX	SS	NT	pH	TB	BO	AM	DATA SOURCE	MONITORED/ EVALUATED	STDS. VIO.	ADDITIONAL COMMENTS
03050109	CAMPING CREEK	NEWBERRY	S-290	11,14,18	N		N		N		N	N	N	I	M		
03050109	CLOUDS CREEK	SALUDA		11,13,18				U			U			III	E		ALSO PT SOURCE
03050109	CORONACA CREEK	GREENWOOD		14,41,43	U			U			U			III	E		ALSO PT SOURCE
03050109	EASTSIDE CREEK	GREENVILLE		32,41,43				U			U			III	E		
03050109	GEORGE'S CREEK	PICKENS	S-063	14,32	N				N		N			I,IV	M,E		
03050109	HARRIS BRANCH	SALUDA	S-293	11,14,18	N	N								I	M		
03050109	KINLEY CREEK	LEXINGTON		14,32,43				U						III	E		
03050109	LAKE GREENWOOD	GREENWOOD	S-131	11			N		N	N	N		N	I,III,IV,VI	M,E		
03050109	LAKE MURRAY HEAD WATERS	NEWBERRY	S-223	11,14,18	S	N	S		S	S		S	S	I,III,IV,VI	M,E		
03050109	LITTLE RIVER	LAURENS	S-034	11,14,43	N		N		N		S		N	I,IV,V	M,E		
03050109	LITTLE RIVER	NEWBERRY	S-099	11,14					N		N			I,IV	M,E		
03050109	LITTLE SALUDA RIVER	SALUDA		11,14,18				U			U			III,IV	E		
03050109	LORICK BRANCH	LEXINGTON	S-151	41,43	N	N			N		N	N		I	M,E		
03050109	MIDDLE BRANCH HEADWATERS	PICKENS		32,43,90				U			U			II	E		
03050109	MINE CREEK	SALUDA		11,14,21				U			U			III,IV	E		
03050109	NORTH CREEK	LAURENS	S-135	11,14	S	N			N	S		N		I,IV	M,E		
03050109	RABON CREEK	LAURENS	S-096	11,14,32					S		N			I,IV	M,E		
03050109	RAWLS CREEK	LEXINGTON	S-287	41,43	N				N		N			I,III	M,E		
03050109	REEDY RIVER	GREENVILLE	S-013	11,41,43	N				N		N		N	I,II,IV,VI	M,E		
03050109	ROCK CREEK	GREENVILLE	S-091	11,14,43	N				S					I,III	M,E		
03050109	ROCKY RIVER	ANDERSON	SV-031	41,43	S		N				S		N	I	M		
03050109	SALUDA RIVER	GREENWOOD	S-186	11,14			S		N		S		N	I,IV,VI	M,E		
03050109	SALUDA RIVER	GREENVILLE	S-007	11,14,43			S				N		N	I,II,III,IV	M,E		
03050109	SALUDA RIVER	LAURENS	S-125	11,14			N		N		N		N	I,III,IV,VI	M,E		
03050109	SALUDA RIVER	PICKENS	S-250	14,32,43							N		N	I,IV	M,E		
03050109	SALUDA RIVER	LEXINGTON	S-149	14,41,43					N					I,III	M,E		ALSO PT SOURCE
03050109	SCOTT CREEK	NEWBERRY	S-044	41,43	N				N		N			I	M	FC	
03050109	U.T. TO ENOREE RIVER	GREENVILLE	BE-001	41,43	N		N				N		N	I	M		
03050109	WEST CREEK	SALUDA	S-051	11,14,18	S									I	M		
03050110	BROAD-SALUDA-CONGAREE	RICHLAND	CSB-01L,R	41,43	N		S		N		S		N	I,III	M,E		
03050110	CEDAR CREEK	RICHLAND	C-069	14	S									I	M		
03050110	FOREST LAKE	RICHLAND	C-068	41,43							S		N	I	M		
03050110	GILLS CREEK	RICHLAND	C-001	41,43	N				N				N	I,III,VI	M,E		
03050110	MILL CREEK	RICHLAND	C-021	90						N				I	M	pH	
03050110	RED BANK CREEK	LEXINGTON	C-067	11,13,58					N	S				I,III,IV	M,E		
03050110	SAVANNAH BRANCH	LEXINGTON	C-061	41,43					N	N				I	M		
03050111	HALFWAY SWAMP	CALHOUN	C-058	11,43	S				N	S	S	N		I	M		
03050111	LAKE MARION	CLARENDON	ST-024	11,12,13			S			S			N	I,II,III,IV	M,E		POT. TOXICS
03050111	TAW CAW CREEK	CLARENDON	ST-018	41,43	N	S			N			S		I	M	FC,DO	
03050112	SANTEE RIVER	BERKELEY	ST-001	11			N		S		S		N	I,VII	M,E		
03050112	SOUTH SANTEE RIVER	GEORGETOWN	MD-639B	11	N									I	M		
03050201	COOPER RIVER	BERKELEY		11,90				U						III	E		
03050201	COOTER CREEK	CHARLESTON	MD-199	90		N	S			N			N	I	M		

TABLE A (Continued)

NONPOINT SOURCE ASSESSMENT

WATERSHED	WATERBODY	COUNTY	STATION #	NPS CATEGORY	FC	DO	TX	SS	NT	pH	TB	BO	AM	DATA SOURCE	MONITORED/ EVALUATED	STDS. VIO.	ADDITIONAL COMMENTS
03050201	EAGLE CREEK	DORCHESTER	CSTL-099	41,43	N									I	M		
03050201	FOSTER CREEK	CHARLESTON		43,63,65	U	U	U							II	E		
03050201	GOOSE CREEK	BERKELEY	MD-114	41,43	S	N	S		N				N	I,VI	M,E	DO	
03050201	LAKE MOULTRIE	BERKELEY		90				U						III	E		
03050201	NEWMARKET CREEK	CHARLESTON		41,43										III	E		DRAINS JUNKYD
03050201	POPPERDAM CREEK	CHARLESTON		32,41,43										III	E		
03050201	SHEM CREEK	CHARLESTON	MD-071	41,43	S	S				S			S	I,V	M,E		
03050201	WANDO RIVER	CHARLESTON		32,41,43	U	U	U							II	E		
03050202	ABBAPOOLA CREEK	CHARLESTON		11,13,65										III	E		
03050202	ASHLEY RIVER	CHARLESTON	MD-052	41,43		S				S			S	I	M		ALSO PT SOURCE
03050202	ASHLEY RIVER	CHARLESTON	MD-049	41,43	S	S	S		S		S		S	I	M		ALSO PT SOURCE
03050202	ASHLEY RIVER	CHARLESTON	MD-034	41,43		S				S			N	I,II	M,E		ALSO PT SOURCE
03050202	ATL SURF-FOLLY BEACH	CHARLESTON		65	U									III	E		
03050202	BRICKYARD CREEK	CHARLESTON		41,43										III	E		DRAINS IND PK
03050202	CHANDLER CREEK	DORCHESTER		41,43,71										III	E		
03050202	CHARLESTON HARBOR	CHARLESTON	MD-165	41,43		S				S			S	I,II,III,VII	M,E		ALSO PT SOURCE
03050202	CLARK SOUND	CHARLESTON		80										III	E		SPOIL RUNOFF
03050202	CONCH CREEK	CHARLESTON		32,41,43	U									II	E		
03050202	COPAHEE SOUND	CHARLESTON		32,41,43	U									II	E		
03050202	ELLIOT CUT	CHARLESTON	MD-025	41,43		S			S		S			I	M		ALSO PT SOURCE
03050202	FOLLY RIVER	CHARLESTON		13,43,65	U	U	U							II	E		
03050202	HAMLIN CREEK	CHARLESTON		32,41,43	U									II	E		
03050202	HAMLIN SOUND	CHARLESTON		32,41,43	U									II	E		
03050202	INLET CREEK	CHARLESTON		32,41,43	U									II	E		
03050202	JAMES ISLAND CREEK	CHARLESTON	MD-122	41,43		S								I	M		
03050202	JEREMY CREEK	CHARLESTON		41,43,65	U	U								II	E		
03050202	KIAWAH RIVER	CHARLESTON		11,13,43	U	U	U							II,IV	E		
03050202	SAWMILL BRANCH	DORCHESTER		32,43,71										III	E		
03050202	STONO RIVER	CHARLESTON	MD-026	13,32,43		S	S				S		S	I,II,III,IV	M,E		ALSO PT SOURCE
03050202	SWINTON CREEK	CHARLESTON		32,41,43	U									II	E		
03050202	WAPPOO CUT	CHARLESTON		41,43										III	E		
03050202	WASSAMASSAW SWAMP	BERKELEY	CSTL-063	90		N	N		S			S	N	I,V	M,E	DO	
03050203	BULL SWAMP CREEK	LEXINGTON	E-034	11,32	N	N			N	N				I,IV	M,E	DO,pH	
03050203	LIGHTWOOD KNOT CREEK	LEXINGTON	E-101	11	S	S								I	M		
03050203	N FORK EDISTO RIVER	ORANGEBURG	E-007	11,41,43	N				N	N			N	I,II,IV	M,E		
03050203	N FORK EDISTO RIVER	AIKEN	E-091	11,13	N		S		N				N	I,IV,VI	M,E	FC	
03050203	N FORK EDISTO RIVER	ORANGEBURG	E-092	11,12			S		S	N			N	I,IV	M,E		
03050203	N FORK EDISTO RIVER	ORANGEBURG	E-099	11,12			S		N	N			N	I,IV	M,E	pH	
03050204	FIRST BRANCH	EDGEFIELD	E-001	41,43	S					S				I	M	FC,pH	LIMITED DATA
03050204	GOODLAND CREEK	ORANGEBURG	E-036	11					N	S				I,IV	M,E		
03050204	S FORK EDISTO RIVER	AIKEN	E-090	11,13,58						S	S		N	I,IV	M,E		
03050205	BOHICKET CREEK	CHARLESTON	MD-195	13,32,43	S	S	S		S				N	I,IV	M,E	FC,DO	
03050205	CHURCH CREEK	CHARLESTON		11,13,65	U									II	E		

TABLE A (Continued)

NONPOINT SOURCE ASSESSMENT

WATERSHED	WATERBODY	COUNTY	STATION #	NPS CATEGORY	FC	DO	TX	SS	NT	pH	TB	BO	AM	DATA SOURCE	MONITORED/ EVALUATED	STDS. VIO.	ADDITIONAL COMMENTS
03050205	DAWHOO RIVER	CHARLESTON	MD-120	13		S	S		S		S		N	I	M		
03050205	EDISTO RIVER	DORCHESTER	E-014	11,13		S			N					I,III,VI	M,E		
03050205	EDISTO RIVER	ORANGEBURG	E-013	11,13,18					N	S				I	M		
03050205	EDISTO RIVER	DORCHESTER	E-015	11,13					N					I	M		
03050205	FICKLING CREEK	CHARLESTON		13		U	U							II	E		
03050205	FISHING CREEK	CHARLESTON		65	U	U								II	E		
03050205	LEADENWAH CREEK	CHARLESTON		13		U	U							II	E		
03050205	POLK SWAMP	DORCHESTER	E-016	11,13,43	N	N			N			N		I	M		ALSO PT. SOURCE
03050206	FOUR HOLE SWAMP	ORANGEBURG	E-059	11,18,32			S		N				N	I,III,IV	M,E		
03050206	GRAMLING CREEK	ORANGEBURG	E-022	11,13,18	S	N								I	M		
03050206	PROVIDENCE SWAMP	ORANGEBURG	E-051	11,13,18	N	N	N		N		S		N	I	M	DO	
03050207	LITTLE SALKEHATCHIE R	COLLETON		11,21				U						III,IV	E		
03050207	PAWLEY'S CREEK	GEORGETOWN		41,43,65										III	E		
03050207	SALKEHATCHIE RIVER	COLLETON	CSTL-006	11,13					N				N	I,IV	M,E		
03050207	SALKEHATCHIE RIVER	BARNWELL	CSTL-028	11,13,58					N				N	I,IV	M,E		
03050208	ASHEPOO RIVER	COLLETON		11,14,43			U	U						III	E		
03050208	BATTERY CREEK	BEAUFORT		41,43,63										III	E		DUMP RUNOFF
03050208	BEAUFORT RIVER	BEAUFORT	MD-002	11,13,43		N			S					I,IV	M,E		
03050208	BEAUFORT RIVER	BEAUFORT	MD-001	11,41,43		N								I,IV	M,E		
03050208	BEAUFORT RIVER	BEAUFORT	MD-004	11,13,43		N								I,IV	M,E		ALSO PT SOURCE
03050208	BROAD CREEK	BEAUFORT		41,43	U									III	E		
03050208	BROAD RIVER	BEAUFORT		11,13,90					U					IV,VII	E		
03050208	CALIBOGUE SOUND & TRIBS	BEAUFORT		13,21,43	U	U	U	U						III	E		
03050208	COLLETON RIVER	BEAUFORT		11,13	U									III,IV	E		
03050208	COOSAWHATCHIE RIVER	JASPER	CSTL-107	11,58			S		S	S			N	I,IV	M,E		
03050208	COOSAWHATCHIE RIVER	HAMPTON	CSTL-109	11	S	S	N		N	S			S	I,IV	M,E		
03050208	IRELAND CREEK	COLLETON	CSTL-044	11	S	S			N	N				I,III	M,E	DO,pH	
03050208	JENKINS CREEK	BEAUFORT		61										III	E		AT HENRYS FARM
03050208	LK WARREN ON BLACK CK	HAMPTON		11,13				U						III	E		
03050208	LUCY POINT CREEK	BEAUFORT		13	U									III	E		
03050208	NEW RIVER	BEAUFORT	MD-118	11,13,43		S				S			N	I,IV,V	M,E		
03050208	OKATIE RIVER	BEAUFORT		11,13	U									III	E		
03050208	OLD HOUSE CK-FRIPP INLET	BEAUFORT		65,90	U									III	E		SHELLFISH PROHB
03050208	POCOTALIGO RIVER	BEAUFORT	MD-007	11,13,58		S	S		N				N	I,IV,V	M,E		
03050208	PORT ROYAL SOUND & TRIBS	BEAUFORT		13,21,43	U	U	U	U						III	E		
03050208	ST HELENA SOUND	BEAUFORT		11,13,90					U					IV,VII	E		
03050208	TRENCHARDS INLET	BEAUFORT		13										III	E		
03050208	WRIGHT RIVER	JASPER		80			U							III	E		SPOIL RUNOFF
03060101	BROADWAY CREEK	ANDERSON	SV-136	11,14,18					S		N			I	M		
03060101	CONEROSS CREEK	OCONEE		11,14,32				U			U			III,IV	E		
03060101	LAKE HARTWELL	OCONEE		11,32,43				U						III,IV	E		ALSO PT SOURCE
03060101	LAKE KEOWEE	OCONEE	SV-312	14									N	I,IV	M		
03060101	LAKE KEOWEE	OCONEE	SV-311	14,32									N	I,III,IV	M,E		

TABLE A (Continued)

NONPOINT SOURCE ASSESSMENT

WATERSHED	WATERBODY	COUNTY	STATION #	NPS CATEGORY	FC	DO	TX	SS	NT	pH	TB	BO	AM	DATA SOURCE	MONITORED/ EVALUATED	STDS. VIO.	ADDITIONAL COMMENTS
03060101	LITTLE RIVER	OCONEE	SV-203	11,21,32		U		U	N					I,III,IV	M,E		
03060101	SIX AND TWENTY CREEK	ANDERSON	SV-181	11,18,32	N				N		S			I,IV	M,E		
03060101	THOMPSON RIVER	OCONEE		11,32,43				U			U			III	E		
03060101	TWELVE MILE CREEK	PICKENS	SV-282	11,14	N				N		S			I,IV	M		
03060101	TWELVE MILE CREEK	PICKENS	SV-015	11,14					N		S			I,III,IV	M,E		
03060101	WHITEWATER RIVER	OCONEE		14,43				U			U			IV	E		
03060102	BATTLE CREEK	OCONEE		21,32				U			U			III	E		
03060102	BEAVERDAM CREEK	OCONEE		11,14				U	U					III	E		
03060102	BRASSTOWN CREEK	OCONEE		21,32				U			U			III	E		
03060102	CHATTOOGA RIVER	OCONEE		11,13,21				U			U			III,IV	E		
03060102	CHAUGA RIVER	OCONEE		21,32				U			U			III	E		
03060102	LAKE RUSSELL	ABBEVILLE		11,14,32				U						III,IV	E		
03060102	OPOSSUM CREEK	OCONEE		21,32				U			U			III	E		
03060102	SAWNEY CREEK	ABBEVILLE	SV-052	14		S								I	M		
03060103	CLARKS HILL RES	McCORMICK		14				U			U			III	E		
03060103	LAKE SECCESSION	ABBEVILLE	SV-121	11,14,32			S		S	S			S	I,III,IV	M,E		
03060103	LAKE SECCESSION	ABBEVILLE	SV-122	11,14						S			S	I,IV	M,E		
03060103	LEGION LAKE	ABBEVILLE		11,43				U						III	E		
03060103	LITTLE RIVER	McCORMICK		14				U			U			III	E		
03060103	LONG CANE CREEK	McCORMICK	SV-318	11,14,31			S		N		S		N	I,III	M,E		
03060103	LOWER THREE RUNS CREEK	ALLENDALE	SV-175	11,13,14					N				S	I	M		
03060103	SUDLOW LAKE	AIKEN		32,58				U			U			II,IV	E		
03060106	BRIDGE CREEK	AIKEN	SV-070	11,14,58			S		S	S			N	I,IV	M,E		
03060106	HORSE CREEK	AIKEN	SV-072	41,43					N	S			S	I	M		
03060106	HORSE CREEK	AIKEN	SV-071	41,43			S		S	S			N	I	M		
03060106	HORSE CREEK	AIKEN	SV-250	41,43,58			S		S	S			N	I,IV	M,E		
03060106	HORSE CREEK POND	AIKEN	SV-096	41,43					N				S	I	M		
03060106	LITTLE HORSE CREEK	AIKEN	SV-317	11,58					N	S				I,IV	M,E		
03060106	LITTLE HORSE CREEK	AIKEN	SV-073	11					N	S			S	I,II	M,E		
03060106	SAND RIVER	AIKEN	SV-069	41,43	S				S	S			N	I	M		
03060106	STEVENS CREEK	McCORMICK		14,58				U			U			III,IV	E		
03060106	TURKEY CREEK	McCORMICK		14				U			U			III	E		
03060107	CUFFEYTOWN CREEK	McCORMICK		14,58				U			U			III,IV	E		
03060107	HARD LABOR CREEK	McCORMICK		13,14				U			U			III	E		
03060107	SAVANNAH RIVER	JASPER		41,43,80			U							III	E		SPOIL RUNOFF

data, 29 percent were based on evaluated data, and 36 percent were a combination of monitored and evaluated.

After analyzing all the data, it became evident that the greatest NPS pollution contributors are agricultural runoff and urban runoff, contributing 67 percent and 43 percent respectively to the identified waterbodies. Other NPS categories include construction (14%), abandoned gravel, sand, and clay mines (6%), silviculture (4%), on-site wastewater systems (4%), hazardous waste (.3%), channelization (2%), landfills (.6%), sludge (.3%), other (1% includes golf course and spoil runoff), and unknown (3%). The total percentage exceeds 100 because several of the identified waterbodies had more than one NPS category contributing to the problem. Nine percent of the waterbodies were also impacted by point source discharges. For these particular waterbodies, nonpoint sources appear to be the primary contributor; however, a point source discharge existed upstream and may contribute to the water quality values as well.

Nine water quality parameters were utilized in the assessment for determining NPS problem areas. The various waterbodies may have had numerous, scattered, or undetermined exceedences of numeric criteria for the parameters concerned. Of the 336 waterbodies identified, NPS problems were indicated with fecal coliform in 46 percent, dissolved oxygen in 29 percent, toxic materials in 23 percent, suspended solids in 14 percent, nutrients in 53 percent, pH in 20 percent, turbidity in 37 percent, biological oxygen demand in 8 percent, and ammonia in 27 percent.

Several of the NPS waterbodies had values that exceeded South Carolina numeric water quality standards of the waterbodies actual use classification for three parameters.[1] Four percent of the waterbodies had dissolved oxygen (DO) exceedences, 2 percent had pH exceedences, 4 percent had fecal coliform (FC) exceedences; 2 percent had both DO and pH exceedences, 1 percent had both DO and FC exceedences, .3 percent had exceedences of both pH and FC, and .6 percent had values which exceeded standards for all three parameters.

1 If 50 percent of the values for a given parameter exceeded the numeric criteria (see Appendix I), that waterbody was considered to contravene State water quality standards for that parameter.

CHAPTER 2

SURFACE WATER NPS METHODOLOGY

Initial NPS Assessment

As defined by the Association of State and Interstate Water Pollution Control Administrators and the Environmental Protection Agency's America's Clean Water, nonpoint sources are those sources of pollution that are not covered by a site-specific discharge permit. With this definition in mind, a methodology was developed to assess waterbodies in South Carolina that are impacted or potentially impacted by NPS.

Data from the S. C. Department of Health and Environmental Control (DHEC) statewide ambient water quality monitoring network were used as primary data source for the Assessment and as a database upon which to build. The monitoring network provides the best representation of general water quality in South Carolina because it contains historical data, has wide coverage of parameters, and provides monthly sampling data. This is the only data source designated as "monitored" for the purpose of this Assessment; all the others are designated as "evaluated".

An initial NPS database was acquired by retrieving data on selected parameters from the 545 active DHEC monitoring stations in the ambient monitoring network between 1983 and 1988. Exceedence of State Water Quality Standards,[1] EPA criteria, and staff professional judgement were used to identify contraventions. These waterbodies were analyzed in detail to determine which parameters had numerous contraventions and which had scattered

1 Class A standards were applied to all assessed waterbodies in order to indicate NPS impacts.

contraventions. Water quality parameters used as indicators of NPS pollution were: fecal coliform bacteria, dissolved oxygen, toxic materials such as heavy metals and pesticides, suspended solids or sediment, nutrients (phosphorus and/or nitrogen), pH, turbidity, biological oxygen demand, and ammonia. Appendix I lists the indicator parameters, the standard or criterion employed to determine contraventions or exceedences, and the source of that standard or criterion.

The State has adopted numeric water quality standards for three of the parameters listed in the assessment: dissolved oxygen, fecal coliform bacteria, and pH. Waterbodies where levels exceeded one or more of the standards for that particular waterbody's classification were determined, and parameters exceeding these levels are denoted in column nine of Table A.

After identifying monitoring stations where the aforementioned water quality parameters contravened applied criteria, additional factors were examined to determine if the levels resulted from NPS pollution. Consideration was given to which parameters were contravened and to the distance of the stations from point source wastewater treatment discharges. If discharges were far enough upstream so as to be out of an area of impact, further consideration was given to land use and geographical characteristics of the area to determine if an NPS category, such as agriculture or urban development, or a combination of categories could be the contributor to observed water quality problems.

Additional information was gathered through a survey of various groups, agencies, and individuals. Survey forms were sent to individuals throughout the State who are knowledgeable in water quality matters, including S. C. Department of Health and Environmental Control district engineers, Soil and Water Conservation District commissioners, members of environmental groups, water-recreation groups, local conservationists, wildlife officers, and other interested public. Appendix II contains a copy of the survey form sent to each of these various groups, agencies, and individuals. The surveys were used to solicit information about specific waterbodies with existing or potential impacts from nonpoint sources, effects on waterbodies, NPS categories, and existing and potential uses of the waterbodies. The data accrued from the surveys were compared to the monitored data. If the impacted waterbody reported by the survey had already been identified from the monitored data, it was also identified as "evaluated" in the Assessment list and additional NPS categories were added as appropriate. NPS impacted waterbodies not already identified from the monitored data were added as new entries to the list and were identified only as "evaluated" in the list.

Waterbodies identified as NPS impaired in the South Carolina Water Quality Assessment 1986-1987 [305(b) Report]; America's Clean Water, the State's Nonpoint Source Assessment 1985, Appendix produced by ASIWPCA; and the National Estuarine Inventory-National Coastal Pollution Discharge Inventory by the National Oceanic and Atmospheric Administration were compared to those already listed and added where necessary along with the corresponding data source designation.

S. C. Land Resources Conservation Commission (LRCC) identified high potential NPS problem areas in the agricultural, construction, and abandoned mine categories utilizing a computerized sediment yield model. LRCC used a geographic information system (GIS) and a sediment yield model called SEDCAD in this assessment. Statewide estimates of sediment yield were derived by combining four spatial data sets (i.e., watershed boundaries, land use/land cover, soil, and hydrology) to develop inputs required by the sediment yield model. As a result of the analysis, hydrologic units were separated by watershed into six Major Land Resource Areas (MLRA) and, upon completion of the analysis phase, were further subdivided into four distinct "potential" sediment yield categories: (1) less than the weighted average, (2) greater than the weighted average, (3) more than twice the weighted average, and (4) more than three times the weighted average. Appendix IV contains a detailed discussion of the modelling methodology and results.

The smallest detailed unit of area usable in the simulation modelling is that of watershed units (subdivisions of the Federal Hydrologic Unit Code areas). Each waterbody within each watershed unit of concern was located on a reference map. Those areas identified as having high potential for agricultural, construction, or abandoned mine[1] runoff were compared to the list of NPS problem waterbodies. Where there was a match, category and data source were added to the Assessment list.

Future NPS Assessment

As described in the Nonpoint Source Management Plan, an important goal of the NPS Program over the next four years will be to implement comprehensive monitoring and assessment procedures to further evaluate specific impacts of NPS pollution and the effectiveness of BMPs in improving degraded water/biological quality, or preventing NPS impacts. It is projected that the NPS monitoring methodology will be finalized and implemented in several watersheds during the 1989 program period. Monitoring and assessment will be completed in targeted watersheds carefully selected by the State's Nonpoint Source Task Force. Waterbodies/watersheds targeted for implementation may include streams, rivers, lakes, estuaries, coastal waters, wetlands, or groundwaters. Located throughout South Carolina, these ecosystems are naturally diverse with respect to physiography, hydrology, biological community and habitat structure, and chemical/physical water quality characteristics. The diversity of nonpoint

1 Active mine runoff is controlled through NPDES permits.

source categories, impacts, and pollutants indicate that flexible site-specific procedures are critical for NPS monitoring and assessment.

It is expected that the following data sources, assessment procedures, and monitoring approaches will be considered in the development of a methodology for NPS studies in targeted watersheds:

HISTORICAL TREND DATA

- Ambient Water Quality Monitoring Data
  - Physical Parameters
  - Chemical Parameters (includes metals/pesticides)
  - Microbiological Parameters
- Ambient Sediment Monitoring Data
  - Chemical Parameters
  - Metals/Pesticides
- Ambient Biological Monitoring Data
  - Fixed Station Monitoring
    - Macroinvertebrates
    - Finfish
    - Crustaceans
    - Shellfish
  - Toxic Materials Monitoring
- Ambient Shellfish Monitoring Data
  - Physical Parameters
  - Bacteriological Parameters
- Ambient Groundwater Monitoring Data
  - Physical Parameters
  - Chemical Parameters

ASSESSMENT/MONITORING PROCEDURES

- Biomonitoring (biointegrity) Studies Using Fish, Macroinvertebrates, Algae, or Habitat Evaluation
  - Before versus After (time trend) Design
  - Above and Below Design
  - Paired Watershed Design
  - Ecoregion Assessment Process
  - Toxicity Testing Studies
- Water Quality Based Synoptic Studies Using Physical/Chemical Data to Evaluation NPS Pollutant Load and Reductions Following BMP Implementation
  - Before versus After Design
  - Above and Below Design
  - Paired Watershed Design
- Predictive NPS Modelling Procedures
  - GIS Mapping
  - Mathematical Modelling of Potential Sediment Yield or Other NPS Related Pollutants - SEDCAD Model

CHAPTER 3

GROUNDWATER ASSESSMENT

The following nonpoint source groundwater pollution assessment is provided in accordance with the Clean Water Act Amendments of 1987, is parallel with the S.C. Groundwater Protection Strategy, and is intended to provide an assessment of nonpoint source (NPS) groundwater rated pollution problems (as defined by U. S. Environmental Protection Agency [USEPA]).

All aquifers in South Carolina meet the requirement for classification as underground sources of drinking water (USDW) in that they provide water containing less than 10,000 mg/l total dissolved solids. All aquifers are subject to Class GB (drinking water) standards (Regulation 61-68) and are to be protected, as such, from adverse alteration. Administratively, facility permitting and groundwater protection program areas of the S. C. Department of Health and Environmental Control have been structured to provide groundwater quality protection from contamination by nonpoint sources.

Separate Bureaus within the Agency have been designated specific responsibilities regarding the major regulated groundwater related NPS pollution categories. These three Bureaus and their general responsibilities regarding nonpoint sources (as identified by USEPA) are as follow:

1. <u>Bureau of Water Pollution Control</u>

   Responsible for permitting and enforcement of:

   a. sludge disposal by land application,
   b. wastewater land treatment (domestic and industrial), and
   c. other individual waste treatment and disposal systems (large absorption fields, etc.)

2. Bureau of Drinking Water Protection

Responsible subcategories (permitting and enforcement):

a. underground storage tanks,

b. injection control,

c. well head protection program, and

d. formation of strategy and policy regarding aquifer designations.

3. Bureau of Solid and Hazardous Waste

Responsible for permitting and enforcement of:

a. landfills, and

b. hazardous waste facilities.

Previous Departmental and cooperative studies and assessments of groundwater pollution sources and aquifer characteristics have provided substantial insight into identification of major groundwater contamination sources, designation of aquifer relationships, and recognition of geographic regions in need of priority protection. For the most part, these studies were funded by federal grants which contributed vastly to current knowledge and understanding of the complex hydrological system of South Carolina. Some of the more significant studies and assessments are as follow:

1. Economic and Environmental Impact of Land Disposal of Wastes in the Shallow Aquifer of the Lower Coastal Plain of South Carolina (SCDHEC, June 1980, 9 volume report). This in-depth study of waste disposal practices involved comprehensive evaluation of ambient groundwater quality of the shallow aquifer and prioritization of generally accepted waste treatment/disposal practices involving land application. Evaluated disposal practices ranged from large industrial tile fields to landfilling of solid wastes. Generally, the study concluded that industrial tile fields, leaky holding ponds, and poorly sited landfills contributed a significant impact to the shallow coastal aquifers.

2. South Carolina Surface Impoundment Assessment (SCDHEC, 1980). General conclusions of this study indicated leaky lagoons comprised a significant potential for aquifer degradation, particularly in areas of permeable soil and high water table situation.

3. Surface and Subsurface Statigraphy, Structure, and Aquifers of the South Carolina Coastal Plain (SCDHEC, 1983). This study provided a comprehensive overview of aquifer characteristics and relationships in the South Carolina Coastal Plain (i.e., potential recharge areas and aquifer interconnection).

4. Designation of Aquifer Systems in the Piedmont Province of South Carolina (SCDHEC, 1987 draft report to EPA). Provided a general overview of major considerations and mechanisms of both the shallow saprolite and underlying fractured bedrock aquifers within the Piedmont Province.

5. Groundwater Nonpoint Source Water Quality Management Plan (SCDHEC, November 1978) This publication was developed by the State 208 Nonpoint Source Management Task Force consisting of DHEC and other governmental agencies. The purpose of this report was to identify and prioritize nonpoint source problem areas and activities; however, due to lack (at the time) of an adequate monitoring database, the assessments were incomplete. However, a strategy was developed utilizing technology of the time to form best management practices (BMPs) for controlling or abating nonpoint source pollution. These practices were developed with cooperative involvement of State and local governments and extensive public interaction including the public hearing process and are generally accepted throughout the State.

The most recent South Carolina Groundwater Contamination Inventory compiled by the Groundwater Protection Division of DHEC contain approximately 390 incidents of groundwater contamination at 350 sources. NPS categories account for 200 incidents including leachate from landfills, leachate from spray irrigation sites, leachate from individual sewage treatment and disposal systems, leaks from tanks or lagoons, and spills. This information is exhibited in Table B. Information for the inventory is based on self-monitoring data from the facility or special investigation. Of 200 sites on the list, approximately 28 percent involve leaking underground storage tanks and leakage or leachate from pits, ponds, and lagoons used for wastewater disposal or storage. Major spills and slow leaks not associated with in-place petroleum tanks comprised 28 percent; landfills (both industrial and municipal) 17 percent; leachate from spray irrigation of wastewater (both industrial and municipal) 13 percent, and leachate from individual sewage treatment and disposal system tile fields 10 percent. The total of percentages exceeds 100 percent because a particular site may have been impacted by more than one category.

Lagoons (including industrial pits and ponds), landfills (industrial and municipal), and underground storage tanks which have documented association with groundwater contamination are not restricted to any particular areas of the State, but are more concentrated in the three major urban/industrial centers: Greenville/Spartanburg, Columbia, and Charleston. An additional concentration of groundwater contamination problems has been associated with high water table recharge areas in Beaufort County.

Corrective action by the appropriate Bureau of the Department has been taken for all of the incidents listed, and most of the problems have been remediated at the site. An unknown factor, however, is the impact of groundwater contamination from inventoried sources on surface water. In many cases, groundwater recharges surface streams and lakes. Therefore, a need exists to carry out investigations in an attempt to link contaminated groundwater to consequently NPS impacted surface water.

TABLE B

GROUNDWATER NPS ASSESSMENT

SITE	COUNTY	PARAMETERS OF CONCERN	NPS CATEGORY
Whitlock Wool Combing	ALLENDALE	NO3	62
Sandoz Colors and Chemicals	ALLENDALE	NO3,METALS,VOC,OTHER	62
Palmetto Dunes Plantation	BEAUFORT	NO3	62
Plusa Inc.	BERKELEY	NO3	62
Carolina Eastman	CALHOUN	NO3	62
Wando River Terminal	CHARLESTON	NO3	62
E.I. Dupont de Nemour	FLORENCE	NO3	62
Wolverine Brass	HORRY	VOC	62
Kendall Company	KERSHAW	NO3	62
Swansea Municipal Sewage Treatment	LEXINGTON	METALS	62
Carolina Gravure	LEXINGTON	METALS	62
Masonite	MARION	NO3	62
Delta Mills Plant	MARLBORO	NO3	62
Ashland Chemical Company	RICHLAND	OTHER	62
National Starch and Chemical	SPARTANBURG	NO3	62
Hoechst Fibers	SPARTANBURG	METALS,VOC	62
Lyman, Town of	SPARTANBURG	NO3	62
Campbell Soup	SUMTER	NO3	62
Sonoco	DARLINGTON	OTHER	62,63,82
Sea Pines Plantation	BEAUFORT	NO3	62,65,82
Abco	SPARTANBURG	VOC, METALS	62,82
International Wire Products	SPARTANBURG	METALS,VOC	62,82,84
Lindau Chemical Company	RICHLAND	VOC	62,84
Savannah River Plant LF DWP-087A	AIKEN	VOC	63
Savannah River Plant - Silverton Rd	AIKEN	VOC	63
Horse Creek Poll. Cntrl. IWP-161	AIKEN	METALS	63
Savannah River Plant - CMP Pits	AIKEN	METALS,VOC,P/H	63
Singer Company	ANDERSON	VOC	63
Owens-Corning LF IWP-015	ANDERSON	VOC	63
Barnwell County LF DWP-001	BARNWELL	VOC	63
Beaufort County LF DWP-063	BEAUFORT	METALS,NO3	63
Charleston County LF DWP-061, -079	CHARLESTON	METALS	63

TABLE B (Continued)

GROUNDWATER NPS ASSESSMENT

SITE	COUNTY	PARAMETERS OF CONCERN	NPS CATEGORY
Landfill, Inc.	CHESTER	VOC, METALS	63
Chesterfield County LF DWP-036	CHESTERFIELD	METALS	63
Chesterfield County LF DWP-017	CHESTERFIELD	METALS	63
Colleton County LF DWP-076	COLLETON	METALS	63
Darlington County LF DWP-060	DARLINGTON	METALS,VOC	63
Edgefield County LF DWP-040	EDGEFIELD	NO3	63
Florence County LF DWP-021	FLORENCE	METALS,VOC	63
Koppers Co., Inc.	FLORENCE	BNA	63
Andrews Wire	GEORGETOWN	METALS	63
Georgetown Steel	GEORGETOWN	METALS,NO3	63
Piedmont LF I & II DWP-009	GREENVILLE	VOC	63
Simpsonville LF	GREENVILLE	VOC	63
City of Greenville LF DWP-070	GREENVILLE	VOC	63
Western Carolina Reg. Sewer IWP-152	GREENVILLE	METALS,NO3	63
Greenwood Co. LF DWP-100	GREENWOOD	VOC	63
Monsanto	GREENWOOD	VOC	63
Helena Chemical	HAMPTON	P/H	63
Kershaw County LF DWP 008 & 008A	KERSHAW	METALS	63
Torrington Co.	LAURENS	VOC	63
Cryovac Dumpsite	LAURENS	METALS,CHLOROFORM	63
Lexington County Landfill DWP-030	LEXINGTON	VOC	63
Carolina Chemicals	LEXINGTON	P/H	63
Farmers Mutual Exchange LF	MARLBORO	METALS,VOC	63
J.P. Stevens IWP-104	OCONEE	NO3	63
Sangamo Weston	PICKENS	PCB	63
Platt Saco Lowell	PICKENS	METALS	63
Chambers/Richland Co. LF DWP-126	RICHLAND	VOC	63
Batchelder-Blasius	SPARTANBURG	METALS	63
Sumter County LF-Cook St.	SUMTER	METALS	63
Shaw AFB	SUMTER	VOC	63
Gist Brocade Fermentation	WILLIAMSBURG	NO3	63,82
Celanese Fibers Operations	YORK	VOC	63,82

TABLE B (Continued)

GROUNDWATER NPS ASSESSMENT

SITE	COUNTY	PARAMETERS OF CONCERN	NPS CATEGORY
Venture Chemical	BEAUFORT	PCB,METALS,VOC	63,82,84
Ethyl Corporation	ORANGEBURG	VOC	63,84
McEntire ANG Base	RICHLAND	VOC	63,84
Groce Laboratories	SPARTANBURG	VOC	63,84
Puretown Restaurant & Truck Stop	ANDERSON	NO3	65
Folly Island	CHARLESTON	NO3	65
Hutchinson Trailer Park	FLORENCE	NO3	65
Columbia Organic Chemical	KERSHAW	VOC,METALS	65
Inland Container Company	LEXINGTON	METALS	65
F.B. Johnston, Inc.	LEXINGTON	VOC	65
Wood Brothers Inc.	LEXINGTON	OTHER	65
Becton Dickinson and Co.	OCONEE	METALS	65
Greenwood Mills Liner Plant	ORANGEBURG	VOC,NO3,PHENOL	65
Fairfield Chemical Company	RICHLAND	VOC	65
Kings Laboratories	RICHLAND	VOC	65
Future Fuels	RICHLAND	VOC	65
Robbins and Myers, Inc.	RICHLAND	NO3	65
Derrick private well	RICHLAND	PETROPROD	65
Spartan Plating and Grinding	SPARTANBURG	METALS	65
Cherryvale Subdivision	SUMTER	PETROPROD	65
Booth Farms	SUMTER	NO3	65
Palmetto Pigeon Plant	SUMTER	NO3	65
Kalama Specialty Chemicals	BEAUFORT	VOC	65,82
Greenwood Mills Edisto Plant	ORANGEBURG	NO3,PHENOL	65,82
Savannah River Plant M-Area	AIKEN	VOC	82
Savannah River Plant-Old TNX Basins	AIKEN	METALS	82
Savannah River Plant L-Area	AIKEN	NO3	82
Savannah River Plant F-Area	AIKEN	RAD	82
Savannah River Plant H-Area	AIKEN	RAD	82
Eliskim, Inc.	ANDERSON	METALS	82
Wamchem	BEAUFORT	METALS,VOC,NO3	82
Independent Nail	BEAUFORT	METALS	82

TABLE B (Continued)

GROUNDWATER NPS ASSESSMENT

SITE	COUNTY	PARAMETERS OF CONCERN	NPS CATEGORY
Parker White Metals Co.	BEAUFORT	METALS	82
Mobay Chemical Corp	BERKELEY	VOC	82
Moore Drums	CHARLESTON	METALS,VOC	82
Geiger Property	CHARLESTON	VOC	82
General Electric	CHARLESTON	VOC	82
Cummins Engine	CHARLESTON	METALS	82
Lockheed-Georgia Company, Inc.	CHARLESTON	METALS,VOC	82
Mobil Chemical Company	CHARLESTON	NO3,P/H	82
Stoller-Mii	CHARLESTON	METALS,NO3	82
Virginia Chemicals	CHESTER	VOC,SALTS	82
Ti-Caro-Knit	CHESTERFIELD		82
Balchem Corp	COLLETON	METALS,VOC	82
Asten Hill Manufacturing Co.	COLLETON	VOC	82
Celanese Fibers	DARLINGTON	VOC	82
Sweetwater community	EDGEFIELD	PETROPROD	82
L-Tec	FLORENCE	VOC	82
Kaiser Aluminum Company	FLORENCE	P/H	82
General Electric Co.	FLORENCE	VOC, METALS	82
Floyd's Grocery	GEORGETOWN	PETROPROD	82
American Cyanimid	GEORGETOWN	Al SULFATE	82
General Battery Corporation	GREENVILLE	METALS	82
T & S Brass and Bronze Works, Inc.	GREENVILLE	VOC,METALS	82
Steel Heddle Manufacturing	GREENVILLE	METALS,VOC	82
Roy Metal Finishing Works, Inc.	GREENVILLE	METALS,VOC	82
Carolina Plating Works	GREENVILLE	METALS, VOC	82
American Hoechst Corp	GREENVILLE	METALS,VOC	82
Westinghouse	HAMPTON	PHENOLS	82
Reichold Chemical Company	HAMPTON	METALS,VOC	82
Pine Valley Estates	HORRY	NO3	82
Garden City Shopping Center	HORRY	MBAS,TDS	82
Hardwicke Chemical	KERSHAW	METALS,VOC	82
E.I. Dupont	KERSHAW	METALS	82

TABLE B (Continued)

GROUNDWATER NPS ASSESSMENT

SITE	COUNTY	PARAMETERS OF CONCERN	NPS CATEGORY
Southern Screening & Engraving	LANCASTER	VOC, METALS	82
Lehigh-Lancaster Inc.	LANCASTER	METALS	82
Simpson private well	LAURENS	PETROPROD	82
Union Switch & Signal	LEXINGTON	METALS,VOC	82
Allied Fibers and Plastic Corp.	LEXINGTON	METALS, VOC, NO3	82
Springdale private well	LEXINGTON	PETROPROD	82
Roper Industries	ORANGEBURG		82
Shuron, Inc.	ORANGEBURG	VOC	82
Chevron/Gulf Terminal	RICHLAND	PETROPROD	82
Bendix/Amphenol Products	RICHLAND	VOC	82
Amphenol Products	RICHLAND	VOC	82
Townsend Textron Sawchain	RICHLAND	METALS,NO3	82
Inman Quarry	SPARTANBURG	VOC,METALS	82
Siemens Allis/ITE	SPARTANBURG	METALS,VOC	82
Blackman-Uhler Chemical	SPARTANBURG	VOC	82
International Mineral Corp.	SPARTANBURG	NO3	82
Milliken Chemical Company	SPARTANBURG	VOC	82
Thermal Oxidation Corp.	SPARTANBURG	VOC	82
Sybron Chemicals Inc.	SPARTANBURG		82
Southern Wood Piedmont	SPARTANBURG	BNA	82
Southern Coatings	SUMTER	METALS	82
CP Chemicals Inc.	SUMTER	METALS,VOC	82
Valchem	AIKEN	VOC	82,84
Perfection Hytest	DARLINGTON	VOC	82,84
Wellman, Inc.	FLORENCE	PETROPROD,VOC	82,84
L & M Self Service	FLORENCE	PETROPROD	82,84
Vicellon	GREENVILLE	VOC	82,84
Crown Metro, Inc.	GREENVILLE	VOC	82,84
Para-Chem, Inc.	GREENVILLE	VOC,METALS	82,84
Seaboard System Railroad	AIKEN	VOC	84
Defense Fuel Support Point	BERKELEY	PETROPROD	84
Chevron Gulf Terminal	CHARLESTON	PETROPROD	84

TABLE B (Continued)

GROUNDWATER NPS ASSESSMENT

SITE	COUNTY	PARAMETERS OF CONCERN	NPS CATEGORY
Swygert's Shipyard	CHARLESTON	PETROPROD	84
Texaco Terminal	CHARLESTON	PETROPROD	84
Broad River Brick	CHEROKEE	PETROPROD	84
Carolawn Industries	CHESTER	VOC	84
Scurry Private well	EDGEFIELD	PETROPROD	84
Winnsboro Petroleum Company	FAIRFIELD	PETROPROD	84
VC Summer Nuclear Station	FAIRFIELD	PETROPROD	84
Korn Industries	FLORENCE	PETROPOD	84
Ethox	GREENVILLE	PETROPROD	84
Cone Mills Union Bleachery	GREENVILLE	METALS	84
Colonial Pipeline Spill Site 2	GREENVILLE	PETROPROD	84
Colonial Pipeline Spill Site 1	GREENVILLE	PETROPROD	84
General Electric Gas Turbine	GREENVILLE	PETROPROD	84
Carolina Plating and Stamping	GREENVILLE	METALS	84
Roll Technology	GREENVILLE	METALS	84
Myrtle Beach AFB	HORRY	PETROPROD	84
Suffolk Chemical Co.	LEXINGTON	VOC	84
Columbia Metropolitan Airport	LEXINGTON	PETROPROD	84
SC Recycling & Disposal-Dixiana	LEXINGTON	METALS,VOC	84
Palmetto Wood Preserving, Inc.	LEXINGTON	METALS	84
S.C. Fire Academy	LEXINGTON	VOC	84
Georgia Pacific Corp.	ORANGEBURG	PETROPROD	84
Palmetto Recycling	RICHLAND	METALS	84
SC Recycling Disposal-Bluff Rd.	RICHLAND	VOC	84
Cardinal Chemical Company	RICHLAND	VOC	84
Westinghouse Nuclear Fuel Div.	RICHLAND	NO3, Fluoride	84
Bell South	RICHLAND	PETROPROD	84
Plantation, Inc.	SPARTANBURG	PETROPROD	84
Union Oil Co.	SPARTANBURG	PETROPROD	84
British Petroleum	SPARTANBURG	PETROPROD	84
Amerada Hess	SPARTANBURG	PETROPROD	84
Crown Central Petroleum	SPARTANBURG	PETROPROD	84

TABLE B (Continued)

GROUNDWATER NPS ASSESSMENT

SITE	COUNTY	PARAMETERS OF CONCERN	NPS CATEGORY
Frank Elmore Site	SPARTANBURG	VOC	84
Ashland Oil Co.	SPARTANBURG	PETROPROD	84
Shell Oil Co.	SPARTANBURG	PETROPROD	84
Chevron, Inc.	SPARTANBURG	PETROPROD	84
Exxon Company, USA	SPARTANBURG	PETROPROD	84
Exide Battery	SUMTER	METALS	84
Carolina Drums	YORK	VOC	84
Leonard Chemical Co.	YORK	VOC,METALS	84

CONTAMINANTS	ABBREVIATION
Total Dissolved Solids	TDS
Surfactants	MBAS
Petroleum Products	PETRO
Volatile Organics	VOC
Metals	METALS
Nitrates	NO3
Pesticides/Herbicides	P/H
PCB	PCB
Base, Neutral & Acid Ex.	BNA
Phenols	PHENOL
Redionuclides	RAD
Other	OTHER

62 - Land Disposal - Wastewater

63 - Land Disposal - Landfills

65 - Land Disposal - Septic Tanks

82 - Waste Storage/ Storage Tank Leaks

84 - Spills

CHAPTER 4

DATA GAPS

The Surface Water NPS Assessment relied heavily on water quality data gathered from DHEC's ambient monitoring network.[1] Since NPS runoff normally occurs during a storm event, trend monitoring does not lend itself to detecting NPS pollution as well as specially timed intensive monitoring surveys or knowledge of location of NPS occurrences. Resources did not allow correlation of trend water quality data with antecedent rainfall data, but this type of analysis will be carried out over the four-year program period as part of the evaluation of watersheds/waterbodies targeted for further study and implementation assessment.

Problem areas reported to us by the interested public comprise 7 percent of those areas listed in the survey. This source of data should necessarily be thought of as subjective until verified by water quality analysis. It is valuable information for the assessment, though, because of the inherent problems with trend monitoring mentioned above and because monitoring stations cannot provide 100% coverage geographically.

It was planned to place special emphasis on state coastal waters by examining data (primarily bacterial) from DHEC's network of approximately 371 shellfish fixed monitoring stations and results of sanitary surveys conducted by district personnel. However, this data analysis requires large amounts of staff time and, due to unforeseen delays, staff has not yet completed this task. This evaluation will be completed during the 1989 program period, and additional NPS problem areas determined from this data will appear in the first year progress

[1] The network of 189 primary stations are sampled once per month year round; 356 secondary stations are sampled once per month during the six summer months (May-October)

report. The State NPS Task Force can consider adding these waterbodies to the lists targeted for implementation or further evaluation.

Due to time and resource constraints, the surface water NPS assessment presented in this report was unable to utilize DHEC data from the 51 fixed biological monitoring stations or special biological monitoring studies. These 51 stations are currently distributed as 26 EPA Basic Water Monitoring Program (BWMP) Stations, 9 Special Status Stations, and 16 Estuarine Stations. Parameters sampled during trend monitoring and intensive surveys may include macroinvertebrates, finfish, shellfish, and crustaceans depending on site characteristics and study objectives. Generally, the biological monitoring network will allow for the detection and evaluation of changes in the biological stability of community structure and the presence and/or build-up of potentially hazardous substances in aquatic organisms.

While some of these stations have been sited to evaluate point source impacts, many were chosen according to these additional criteria:

a. At locations in selected major waterbodies potentially subject to inputs of contaminants from areas of concentrated urban, industrial, and/or agricultural use.

b. At locations in selected waterbodies which are of critical value for sensitive uses such as domestic water supply, recreation, propagation, and maintenance of fish and wildlife.

c. At locations in selected areas suited to deliver natural background water quality characteristics on a long-term basis.

d. At locations in selected areas where specific water quality impairment has been documented with ameliorative procedures in place to follow the response of the water system to those procedures.

As such, biological data from these stations can be used to evaluate the long-term impacts of nonpoint sources and to provide biological community structure and stability information on these specific waterbodies. Additionally, the Water Quality Assessment and Enforcement Division (DHEC) has completed numerous special and intensive studies within streams, lakes, and estuaries throughout the State. Once integrated into an appropriate procedure, State biomonitoring data mentioned above will be extremely useful in establishing a baseline of naturally occurring biotic assemblages throughout geographic regions of the State. This information will be invaluable within a methodology aimed at assessing NPS impacts and effectiveness of BMP implementation.

As stated within Section III of the NPS Management Program entitled "Targeting and Monitoring Waterbodies/Watersheds", a flexible site-specific methodology emphasizing biomonitoring and water quality based approaches will be used over the next four years of the NPS Program. Available biological monitoring data, such as the DHEC data described above, and information from other agencies including S. C. Wildlife and Marine Resources Department and U. S. Forest Service will be a significant input into development and implementation of a NPS monitoring and assessment methodology.

It is evident from previous hydrogeological studies and the contamination inventory that significant nonpoint groundwater pollution sources exist within South Carolina, and significant geological data exists to generally identify geographic areas of particular protection need. It is also evident the overall NPS management plan regarding groundwater should address:

1. Updating and formalizing of land disposal BMPs;
2. A management plan to collect, store, and evaluate groundwater monitoring information;

3. Prioritization of nonpoint sources of groundwater impact by geographical/geological location; and
4. Optimization, coordination, and cooperation among the U. S. Geological Survey, S. C. Water Resources Commission, S. C. Land Resources Conservation Commission, USDA Soil Conservation Service, and other State and federal agencies.

CHAPTER 5

IDENTIFICATION OF HIGH QUALITY WATERS

Some high quality waters in the State are threatened by potential degradation from nonpoint sources due to proposed or actual changes in cultural activities. An inventory of such waters was developed using two criteria. The South Carolina Water Classifications and Standards Regulation (61-68) defines high quality waters as those "surface waters where quality exceeds levels necessary to support propagation of fish, shellfish, and wildlife; and recreation in and on the water . . . ." A list of such waterbodies was extracted from the 1986-87 Statewide Water Quality Assessment 305(b) Report and matched with watersheds that have a high potential for NPS runoff as defined by the S. C. Land Resources Conservation Commission model employed for this Assessment. This methodology produced a list of 36 waterbodies/watersheds that are shown in Table C. They are spread over the entire state and include mountain streams, large midstate rivers, blackwater creeks, coastal creeks and rivers, and impoundments. The State Nonpoint Source Task Force will consider these waterbodies for specific measures to prevent NPS pollution when prioritizing and targeting waterbodies for implementation programs within the NPS Management Program. Additionally, preventive programs of a more general nature will be recommended and implemented through the Management Program.

TABLE C

HIGH QUALITY WATERS

Waterbody Name	Watershed(s)	County(s)
Black River	03040205-140	Williamsburg
High Hill Creek	03040201-110	Darlington
Little Pee Dee River	03040204-30,60	Dillon, Marion
Pee Dee River	03040201-29,160	Marion, Marlboro
Sparrow Swamp	03040202-100	Florence
Swift Creek	03040201-110	Darlington
Allison Creek	03050101-100	York
Middle Saluda River	03050109-20	Greenville
North Saluda River	03050109-10	Greenville
North Tyger River	03050107-20	Spartanburg
Princess Creek	03050109-40	Greenville
Rabon Creek	03050109-130	Laurens
Saluda River	03050109-40,80,150	Greenville, Greenwood, Laurens, Pickens
Un. Trib. to Crawford Ck.	03050105-142	York
Black Creek	03050208-60	Hampton
Combahee River	03050208-10	Hampton
Coosawhatchie River	03050208-50	Allendale, Hampton
Shaw Creek	03050204-20	Aiken
South Fork Edisto River	03050204-10,30	Aiken
Turkey Creek	03050207-20	Barnwell
Big Generostee Creek	03060103-30	Anderson
Chattooga River	03060102-30,60	Oconee
Cherokee Creek	03060103-70	Anderson
Coneross Creek	03060101-80	Oconee
East Fork Chattooga River	03060102-30	Oconee
Little River	03060101-30	Pickens
Rocky River	03060103-70	Anderson
Savannah River	03060106-60	Aiken
Lake Robinson	03040201-100	Chesterfield
Prestwood Lake	03040201-110	Darlington
Lake Greenwood	03050109-80	Greenwood
Lake Lanier	03050105-155	Greenville
North Saluda Reservoir	03050109-10	Greenville
Table Rock Reservoir	03050109-20	Greenville
Bridge Creek Pond	03050204-10	Aiken
Lake Hartwell	03060101-40,	Anderson
	03060102-130,	Anderson, Oconee
	03060103-20	Anderson
Lake Keowee	03060101-50	Oconee
Lake Richard B. Russell	03060103-30	Anderson
Lake Secession	03060103-70	Abbeville
Leadenwah Creek	03050202-70	Charleston
Kiawah River	03050202-70	Charleston
Beaufort River	03050208-100	Beaufort

TABLE C (Continued)

Waterbody Name	Watershed	County(s)
Chechessee River	03050208-90	Beaufort
Colleton River	03050208-90	Beaufort
Combahee River	03050208-10	Beaufort
Broad River	03050208-90	Beaufort
Dawhoo River	03050202-70	Charleston
North Edisto River	03050202-70	Charleston, Colleton
Port Royal Sound	03050208-90,100	Beaufort
Trenchards Inlet	03050208-100	Beaufort
Whale Branch	03050208-100	Beaufort

(See Figure 1 for the location of these watersheds.)

CHAPTER 6

SPECIAL CONCERNS

A. Antidegradation

<u>South Carolina Water Classifications and Standards</u> contains rules concerning protecting uses and quality of the State's waters. One of the rules states the Department will not allow degradation of the quality of the State's waters unless "after intergovernmental coordination and public participation, that allowing lower water quality is necessary to important economic or social development in the areas where the waters are located. In allowing such lower water quality, water quality adequate to fully protect existing uses shall be maintained. The highest statutory and regulatory requirements for all new and existing point sources shall be achieved and <u>all cost-effective and reasonable best management practices for nonpoint source control shall be encouraged.</u>" (emphasis added). Proposed revisions to these rules add a phrase that strengthens this passage. If this revision is kept, the sentence will read ". . . all cost effective and reasonable best management practices for nonpoint source control shall be achieved within the State's statutory authority and otherwise encourages."

While the proposed policy meets EPA's criteria for antidegradation statements including NPS, it does not contain specific procedures for implementation. During the coming year, the Department will develop and adopt an antidegradation implementation procedure which will describe how the State addresses the issue of allowable degradation. The procedure will describe what type of waters are considered for allowable degradation and the methodology to be used to determine to what extent degradation will be permitted. The procedures will address nonpoint sources of pollution consistent with the proposed wording cited above.

B. Wetlands

The Assessment addresses NPS impacted wetlands, both freshwater and coastal. Table A contains names of at least ten freshwater wetlands (swamps) and many of the 68 coastal waterbodies in watersheds 03040207, 03050202, 03050208, and 03060109 are all or partially wetlands. Impacted wetlands will be given high priority for control in implementation of the NPS Management Program.

* Wetlands Habitats

There are approximately 4,659,000 acres of wetlands in South Carolina. This represents approximately 23 percent of the State's total area and comprises approximately 12 percent of the wetlands in the southeastern United States. Dominant wetlands types in South Carolina are intertidal emergent wetlands--saltmarshes and palustrine forested wetlands--swamps and bottomland hardwood forests.

Wetlands provide many and diverse functions: flood water storage, sediment trapping, nutrient removal, groundwater recharge, aquatic food chain support, fish and wildlife habitat, and shoreline stabilization. Wetlands are also valuable for their educational uses and their intrinsic qualities.

* Regulatory Programs

The main mechanisms for wetlands protection in South Carolina are through federal and State regulatory programs for the discharge of dredged or fill material and activities in critical areas in the coastal zone.

Following is a brief description of these existing federal and State programs and their relationship to wetlands protection.

Section 404 of the federal Clean Water Act requires a permit for discharge of dredged or fill material into waters of the United States. The U. S. Army Corps of Engineers administers this program in South Carolina; the U. S. Environmental Protection Agency has ultimate authority in that it may prohibit use of a disposal site if the discharge will have an adverse impact on municipal water supplies, shellfish beds and fishery areas, wildlife, or recreational areas. This permitting program applies to activities in navigable waters, their tributaries, and wetlands adjacent to these waters. Fills of less than 1.0 acres into isolated wetlands are covered under a Nationwide Permit issued by the Corps and certified by S. C. Department of Health and Environmental Control. Projects of 1-10 acres in size must notify the Corps of Engineers to see if a permit is needed.

Section 401 of the Federal Clean Water Act requires any applicant for a federal license or permit to conduct an activity which may result in a discharge to navigable waters to receive certification from the State that the discharge will not cause a contravention of the State's water quality standards. S. C. Department of Health and Environmental Control is the agency which issues certification in South Carolina. Those activities in wetlands adjacent to navigable waters which require Section 404 permits also require certification. The Department evaluates whether or not the proposed activity will adversely impact the wetlands itself or adjacent waters due to loss of wetlands functions.

South Carolina Coastal Council reviews Section 404 permits as well as administers its own permit program for projects within critical areas in the Coastal Zone. Critical areas are saline waters subject to tidal ebb and flow, tidelands, beaches, and primary ocean front dunes. Coastal Council provides additional protection to isolated freshwater wetlands in the eight coastal counties through review of applications for Section 404 permits under Corps Nationwide Permit Number 26 where the activity will result in the discharge of dredged or fill material and cause the loss or modification of 10 acres or less of non-tidal waters above stream headwaters or in isolated waters, including wetlands.

The South Carolina Heritage Trust Program is responsible for surveying and inventorying rare or vanishing plant and animal species and plant and natural communities. This includes wetlands communities, and the Heritage Trust Program has had a particular interest in Carolina Bays. The program provides protection to special areas through acquisition, easement, or landowners cooperation.

* Wetlands Legislation

South Carolina Water Resources Commission has submitted proposed legislation for consideration by the South Carolina General Assembly. Only wetlands adjacent to streams with an annual flow greater than 5 cfs would be regulated and only certain activities such as dredging, deposition, construction of structures, and hydrologic modification would require permits. Certain activities are exempt under this proposed legislation.

* Wetlands Mapping and Inventory

A complete inventory of wetlands in South Carolina is important so wetlands in the State can be identified and classified. When this survey has been completed, State and federal agencies, the public, and the Legislature can evaluate the status of wetlands based on accurate and detailed assessment. Currently, this type of detailed information is not available on a statewide basis.

In 1986, S. C. Coastal Council and U. S. Army Corps of Engineers entered into an agreement with U. S. Fish and Wildlife Service to identify and map wetlands resources within eight coastal counties: Horry, Georgetown, Charleston, Berkeley, Jasper, Beaufort, Dorchester, and Colleton. These maps identify major wetlands systems, hydrologic conditions, vegetative type or substrate, and other characteristics such as modifiers to hydrology, water chemistry, and/or man's influence on wetlands. The boundary of each wetlands area was identified using aerial photography, field checked and delineated by wetlands type, on U. S. Geological Survey 7.5 minute topographic maps.

In 1987, S. C. Coastal Council and S. C. Land Resources Conservation Commission (LRCC) entered into an agreement whereby LRCC will digitize completed wetlands inventory maps. By digitizing these data, statistical analyses can be performed and an accurate inventory, including acreage of each wetlands area identified, number of similar wetlands within the State, county, and topographic quadrangle, and total number of wetlands acres by type or groups can be obtained. This type of statistical information is far reaching and will prove invaluable to the public and, in particular, natural resource users, planners, and legislators. Furthermore, once the wetlands have been identified and digitized into a computer format, an accurate inventory can be maintained in a cost effective manner. Identifying wetlands changes on aerial photographs and updating computer files (maps) as needed is relatively easy once the map and inventory data are entered (digitized) and stored in a computer. New statistical information can be easily generated by the computer software and a cost effective method of monitoring loss or creation of wetlands within the State becomes feasible.

* Education and Research

South Carolina Sea Grant Consortium supports research pertaining to wetlands. They provide scientific information to regulatory/management agencies as well as educational information to the general public. The Consortium is currently preparing new educational materials on wetlands including a video tape, a slide show, and a brochure.

* Governor's Freshwater Wetlands Forum

Governor Carroll A. Campbell, Jr., of South Carolina was a member of the National Wetlands Policy Forum. In response to recommendations from the National Forum, Governor Campbell has convened a State Forum to develop a wetlands policy for South Carolina. His goal is to define wetlands, identify and inventory wetlands in South Carolina, and provide protection. Governor Campbell supports the goal of the National Forum of "no net loss of the nation's remaining wetlands base." The State Forum is comprised of representatives from the Legislature, State regulatory agencies, agriculture, industry, and environmental interest groups.

CHAPTER 7

PROCESS FOR DEFINING BEST MANAGEMENT PRACTICES

Best Management Practices (BMPs) for controlling nonpoint sources of pollution are defined as methods, measures, or practices which have been determined to be the most effective and practicable means of preventing or reducing water pollution to a level compatible with State water quality goals. They include, but are not limited to, structural and non-structural controls and operation and maintenance procedures.

There were seven categories of NPS pollution identified in the Assessment as impacting the State's waterbodies and groundwaters including agricultural activities, forestry activities, construction activities, urban runoff, mining activities, land disposal activities, and hydrologic/wetlands modification activities. BMPs for each category will be identified in the NPS Management Program.

The South Carolina Department of Health and Environmental Control, DHEC is the lead oversight agency for the Clean Water Act, Section 319, NPS Management Program. The NPS staff of the Bureau, as part of the NPS Management Program document preparation, will compile a list of appropriate BMPs to reduce pollution from each of the seven Assessment identified categories of NPS pollution. Recommended BMPs will be those known to impact water quality positively. Lists will be compiled on the advice of and after consultation with federal, State, and local agencies identified as having an implementing role in the control of NPS pollution in South Carolina. The lists will be further refined with input from cooperating agencies which have membership on the State

NPS Task Force. The public will also have input through the review and comment process.

Agencies having an implementing or advisory role in NPS pollution control are listed below:

Federal Agencies

1. USDA Soil Conservation Service
2. USDA Agricultural Stabilization and Conservation Service
3. U. S. Forest Service
4. U. S. Army Corps of Engineers
5. U. S. Geological Survey
6. USDA Agricultural Research Service

State Agencies

1. S. C. Department of Health and Environmental Control
2 S. C. Forestry Commission
3. S. C. Coastal Council
4. S. C. Land Resources Conservation Commission
5. S. C. Water Resources Conservation Commission
6. Clemson University Pesticide and Fertilizer Control
7. Clemson University Cooperative Extension Service
8. Clemson University Department of Agricultural Engineering
9. S. C. Wildlife and Marine Resources Department
10. Governor's Office of Energy, Agriculture, and Natural Resources

Local Agencies

1. Soil and Water Conservation Districts
2. County governments
3. Watershed Conservation Districts

Several of the categories previously mentioned are regulated in this State. They include surface mining, land disposal (landfills, land application of wastewater and sludge, and individual sewage treatment and disposal systems), and hydrologic/wetlands modification. Further, construction/urban stormwater runoff are regulated by county ordinance where ordinances are in force, construction/urban stormwater runoff/forestry activities are regulated on State owned lands, and certain agricultural waste activities are permitted. Federal regulations may also apply, for example U. S. Army Corps of Engineers regulations pertaining to hydrologic/wetlands modification. When regulatory programs cover an activity, BMPs are mandatory rather than voluntary. The practices may be defined in the regulation itself or described in accompanying guidance. A guidance document is being developed for land application or wastewater facilities which will describe BMPs to protect both surface and groundwater.

The NPS Management Program will include a list of tasks with accompanying schedules for the four-year program period. Many of these tasks will address BMP related topics such as research in developing new technology, testing effectiveness, demonstrations, and promoting voluntary use.

The NPS Management Program will target and prioritize waterbodies/watersheds named in the NPS Assessment list for implementation of BMPs over the next four years. As these watershed implementation projects take place, appropriate BMPs will be selected depending upon the category or categories of NPS impacting the watershed. A team approach will be utilized, with implementing and coordinating agencies assessing needs and selecting BMPs which are appropriate for use in the watershed. Local coordination of BMP implementation will be stressed; in most cases the Soil and Water Conservation District will be be key contact. Public involvement will be sought. Ultimate implementation of BMPs depends on cooperation by the landowner. Whether he is a farmer, contractor, logger, etc., the landowner will ultimately determine the use of BMPs on his land. Therefore, control measures will be refined to fit his needs. DHEC NPS staff will provide leadership and overall coordination during the implementation process.

To summarize, the South Carolina NPS Management Program will solicit input from many different groups (governmental agencies, landowners, etc.) in determining and identifying BMPs for NPS control. The process will be flexible enough to allow modifications for use in various types of watersheds and to meet individual needs.

CHAPTER 8

STATE AND LOCAL NPS PROGRAMS

Numerous State and local agencies administer programs which, as a primary or secondary goal, help to reduce nonpoint source pollution. Implementation of best management practices and controls will require the coordinated effort of these agencies. The NPS Management Program will focus on interagency cooperation, voluntary compliance, mandatory compliance, and public education/awareness in order to effectuate implementation of BMPS and consequent improvement in the State's water quality.

A total of seven categories of NPS pollution have been identified in this Assessment as impacting the State's waters including those from the following activities: agriculture, forestry, urban runoff, construction, surface mining, land disposal, and hydrologic/wetlands modification. Types of programs carried out by agencies involved with NPS pollution fall under five general types: technical assistance, regulation, education/information, financial assistance, and research/monitoring. Following is a detailed description of these State and local programs by NPS category.

State and Local Programs Relating to Agricultural NPS

* Technical Assistance

The South Carolina Land Resources Conservation Commission (LRCC) is the implementing agency for the S. C. Erosion and Sediment Reduction Act (Ch. 18, Title 48, Code of Laws 1976) and as such is designated as the State agency responsible for developing, coordinating, and promoting erosion and sediment reduction in the State. Through the Soil and Water Conservation Law, LRCC coordinates the activities of the 46 Soil and Water Conservation Districts (SWCD) in the State and provides demonstrations and technical assistance for implementing soil and water conservation programs in conjunction with SWCD, local governments, and other entities. LRCC also provides technical assistance to 58 Watershed Conservation Districts (WCD) established in the State.

Clemson University is the State's land grant institution. The Cooperative Extension Service at Clemson provides technical assistance and serves as a vehicle for technology transfer through educational demonstrations and individual contact with farmers. Each county in the State has a local County Extension Office and this office often coordinates with other local entities in providing technical assistance and other programs.

The S. C. Soil and Water Conservation Districts Law authorizes the creation of Soil and Water Conservation Districts (SWCDs). Forty-six SWCDs have been organized pursuant to the Law. The boundaries of SWCDs correspond with county boundaries. SWCDs are subdivision of State government. They have the authority to carry out soil and water conservation programs within their boundaries in conjunction with landowners and users and in cooperation with government agencies. The work of each SWCD is managed by a board of five non-salaried commissioners for four years. SWCDs focus attention on land, water, and related natural resource problems; develop plans and programs to solve them; secure professional, technical, and financial assistance from public and private sources; and enlist land users and others interested in conservation in accomplishing the goals of the District. SWCDs rely primarily on voluntary action and cooperation to achieve their objectives.

The S. C. Watershed Conservation Districts Law authorizes the creation of Watershed Conservation Districts (WCDs). Fifty-eight WCDs have been established pursuant to this Law. Each WCD lies within a specific watershed. WCDs are subdivisions of State governments. They are organized under the supervision of Soil and Water Conservation Districts (SWCDs). The S. C. Land Resources Conservation Commission assists SWCDs in their responsibilities of maintaining the organization of WCDs and carrying out projects. The purpose of WCDs is to develop and administer projects within their boundaries for erosion control, flood prevention, and related needs. Erosion control includes vegetative and structural measures. Flood prevention includes channels and flood retarding reservoirs. Some reservoirs serve additional uses, such as public water supply and recreation. The work of each WCD is managed by a board of five locally elected directors. Terms of office for directors are four years. To assist in the administration of projects, WCDs are authorized to receive funds from taxes levied on real property within the District.

* Regulatory Programs

SCDHEC's Bureau of Water Pollution Control administers the Agricultural Waste Management Program in cooperation with USDA Soil Conservation Service. This is accomplished primarily through a permitting and inspection program which requires landowners to apply certain best management practices for waste control.

Clemson University, Department of Fertilizer and Pesticide Control is responsible for administration and enforcement of the S. C. Pesticide Control Act and the Chemigation Act. The Pesticide Act regulates storage, sale, use, quality control, and numerous other areas related to the use of pesticides. The Chemigation Act regulates application of chemicals through irrigation equipment. Clemson University is involved with licensing, compliant and compliance inspections, and enforcement of these Acts.

* Financial Assistance

State Conservation Tax Credit legislation provides State income tax credits for the purchase of conservation tillage planters and drip irrigation and for the construction and restoration of water impoundments including those for the purpose of erosion and sediment control. S. C. Land Resources Conservation Commission developed technical criteria for the South Carolina Tax Commission for implementation of this legislation and provides technical and regulatory assistance to landowners and users in planning and installation of the practices. Applicants for the water impoundment tax credit must obtain either a construction permit (pursuant to the S. C. Dams and Reservoirs Safety Act) from LRCC or a certificate of exemption which may be issued by either LRCC or the SWCD in which the impoundment is located. While this is not a true source of financial assistance, the tax credit serves as a financial incentive.

S. C. Land Resources Conservation Commission, through the Governor's Office, receives funds from the Department of Energy, Petroleum Violation Escrow Fund to purchase conservation tillage and drip irrigation installation equipment. This equipment is then made available for rent by agricultural landowners for a minimal fee which covers maintenance costs.

* Education and Information

S. C. Land Resources Conservation Commission publicizes and promotes erosion and sediment guidelines through education and information programs. Educational programs and information transfer are utilized extensively by LRCC. Also, they coordinate activities of the Soil and Water Conservation Districts (SWCD) and provide assistance to the Watershed Conservation Districts (WCD). New and innovative best management practices are tested, demonstrated, and publicized prior to recommendation by LRCC.

Clemson University Cooperative Extension Service has provided training courses and other informational programs relating to proper use of pesticides and chemigation. A brochure on chemigation was developed by the Extension Service in cooperation with Clemson's Department of Fertilizer and Pesticide Control.

* Research/Monitoring

The research program of the Clemson University College of Agriculture develops new technology for environmentally sound agricultural production. In addition, data for these new practices are collected and analyzed. For example, the Integrated Pest Management Program and the Low Input Sustainable Agricultural Program complement the NPS Management Program. Both of these Programs are developing practices to enhance water quality and reduce production costs. In concert with research programs is the Cooperative Extension Service. The link between these two entities is the Experiment Stations where a large portion of research is conducted. The Extension Service provides technical assistance and serves as a vehicle for technology transfer through educational demonstrations and individual contact with farmers.

<u>State and Local Programs Relating to Forestry NPS</u>

*Technical Assistance

The S. C. Forestry Commission provides technical assistance to non-industrial private landowners. Forestry Commission staff foresters are assigned to each county of the State to assist landowners with proper management of their forest land.

* Regulatory Programs

The S. C. Forestry Commission has regulatory authority to apply practices of the Erosion, Sediment, and Stormwater Management Plan on State Forest lands administered by the Commission and in advice given to other State agencies that own forest land.

*Education and Information

The S. C. Forestry Commission and the S. C. Forestry Association have recently cooperated in the development of two publications on Best Management Practices in South Carolina. These publications are designed to promote more awareness and use of BMPs among landowners, industry foresters, consulting foresters, loggers, contractors, and others practicing forest management.

Through the cooperation of S. C. Forestry Commission, S. C. Forestry Association, and Clemson University Extension Service, training programs using video and slide tapes are being developed to educate landowners and the forestry community concerning the importance of utilizing BMPs. Separate programs are being prepared for general and specific audiences.

State and Local Programs for Construction NPS

* Technical Assistance

S. C. Land Resources Conservation Commission, upon request, reviews plans submitted pursuant to the Erosion and Sediment Reduction Act, conducts meetings and negotiations with architect-engineering firms, and provides field inspection services during the construction of projects. LRCC recommends construction BMPs from a technical manual they developed for use during construction projects which covers planning stages through final landscaping, and maintenance. LRCC also provides technical assistance to the staff of the State Engineer's Office.

* Regulatory Programs

The State Engineer's Office, S. C. Budget and Control Board, is responsible for approving all plans for work in conjunction with the State's permanent improvement projects program (PIP). LRCC is responsible for all projects which fall outside the PIP program and for continuing programs such as Clemson University Experiment Stations and non-federal activities of the S. C. Public Service Authority (Santee Cooper).

S. C. Department of Highways and Public Transportation (SCDHPT) has adopted regulations for erosion and sediment reduction and stormwater management on lands and land-disturbing activities under its jurisdiction. S. C. Forestry Commission has also developed a plan based on BMPs for erosion and sediment reduction on State owned lands under its jurisdiction.

S. C. Department of Health and Environmental Control (SCDHEC) enforces the EPA requirement that BMPs be implemented during construction of waste treatment facilities which receive federal funds. NPS control measures must be addressed in construction plans and specifications submitted to DHEC for review and approval.

Fifteen counties and several municipalities have adopted erosion and sediment control ordinances which regulate construction activities. Other counties and municipalities regulate some construction activities through provisions in subdivision regulations, zoning ordinances, or building permit programs.

* Education and Information

S. C. Land Resources Conservation Commission provides educational assistance to the staff of the State Engineer in the form of on-the-job training, formal workshops, and handbooks and guides. LRCC has published the technical manual <u>Erosion and Sediment Control Practices for Developing areas</u>

which is utilized as the implementing tool for construction related BMPs by developers, consultants, contractors, etc.

State and Local Programs for Urban Runoff NPS

* Technical Assistance

S. C. Land Resources Conservation Commission provides technical assistance to local governments, landowners, developers, and the technical community through workshops, seminars, field visits, and other approaches. LRCC offers technical assistance in identifying and correcting problems, demonstration of conservation technology, and assistance to local governments in developing programs, ordinances, and policies and construction of flood prevention projects.

S. C. Coastal Council provides technical assistance to local units of government to achieve more comprehensive implementation of stormwater management guidelines. Two planning services are also provided by S. C. Coastal Council. Through the "Special Area Management Plan" (SAMP), local governments utilize S. C. Coastal Council staff to obtain planning information on existing and proposed development projects. The "Shore Front Management Plan" enables coastal communities to receive assistance relating to beach erosion and coastal development.

Soil and Water Conservation Districts (SWCD) are responsible for providing leadership for implementation of local erosion, sediment, and stormwater programs through technical assistance, demonstration, and coordination of efforts among governmental agencies, organizations, and landowners and users. Each SWCD appoints a Local Advisory Council of Erosion and Sediment Reduction.

* Regulatory Programs

S. C. Land Resources Conservation Commission and S. C. Coastal Council have been designated as coordinating agencies, in conjunction with other federal, State, and local agencies to develop strategies to reduce impacts of urban runoff pollution control. LRCC has responsibility for all non-coastal counties and will work jointly with S. C. Coastal Council to develop strategies in coastal areas.

The S. C. Erosion and Sediment Reduction Act requires LRCC to implement a statewide erosion and sediment reduction and stormwater management program. Through the S. C. Coastal Zone Management Act of 1977, S. C. Coastal Council was authorized to develop a Coastal Zone Management Program and review all federal and State permit applications to ensure compliance with the Program. The South Carolina Coastal Council Stormwater Management Guidelines is utilized as the BMP guideline for reviewing development proposals requiring permit and certification decisions within the coastal zone. These guidelines are based upon authority of policies and regulations set forth in the South Carolina Coastal Zone Management Program.

S. C. Department of Health and Environmental Control considers potential for contamination of stormwater runoff from municipal, private, domestic, or industrial waste treatment plant sites prior to issuing NPDES permits or State construction permits. Where necessary, DHEC requires BMPs to control runoff.

Local Advisory Councils on Erosion and Sediment Reduction in each Soil and Water Conservation District are charged with examining erosion, sediment, and stormwater problems, reviewing existing programs and recommending new approaches, and assisting in program development and implementation.

Eighteen counties and several municipalities have adopted erosion and sediment control and/or storm drainage ordinances. These sediment control ordinances have been adopted pursuant to the County Sediment Control Program Act passed by the General Assembly in 1971.

* Financial Assistance

S. C. Land Resources Conservation Commission provides financial assistance to communities through State appropriations for flood prevention projects which include benefits of improved stormwater management and better operation of individual sewage treatment and disposal systems and public sewer systems. Projects are implemented in conjunction with SWCDs, local governments, USDA Soil Conservation Service, and landowners.

* Education and Information

S. C. Land Resources Conservation Commission staff are involved in development of technical standards and manuals, educational materials, and demonstration of conservation technology. LRCC has also established a network of computer hardware and software to provide technical support for their staff. Collaborative efforts have been established with university engineering departments to form a strong base for assisting communities and local governments having a need for new technology in erosion and sediment control and stormwater management.

S. C. Coastal Council has published <u>South Carolina Coastal Stormwater Management Guidelines</u>. This booklet provides information necessary for individuals to gain a clear understanding of compliance requirements which pertain to various classes of projects.

State and Local Programs for Mining NPS

* Technical Assistance

S. C. Land Resources Conservation Commission provides technical assistance to mine owners and operators concerning design and installation of BMPs during mining and reclamation. The staff has the expertise to provide site-specific information including design and construction of sediment and erosion control structures, hydrologic monitoring and recharge devices, wildlife protection and habitat restoration, and various types of reclamation.

* Regulatory Programs

S. C. Land Resources Conservation Commission has been designated primary regulatory responsibility for administering and implementing the South Carolina Mining Act and its implementing regulations. Enforcement of the Act is through approval of reclamation plans, issuance of mining permits, collection of reclamation bonds, regulate inspection of mining operations, development of technical standards, and publishing of informational manuals.

The South Carolina Mining Council coordinates activities associated with administration of the Mining Act with LRCC. This is an independent body, created by the South Carolina Legislature, with members from State government, the mining industry, non-governmental conservation interests, and water and air resource management. The Council's responsibilities include promulgating rules and regulations providing for administration of the Act and serving as first line of appeal for any decision or determination made by LRCC. Certain mining activities require NPDES permits and State wastewater construction permits which would be administered by DHEC.

* Education and Information

S. C. Land Resources Conservation Commission is involved in research to develop or refine technical standards. Information gained from research projects is distributed to mine operators as part of an overall goal of education. Seminars are held for mine operators to enhance knowledge of the Mining Act and usage of BMPs. LRCC has published several booklets including a handbook of recommended practices for mine operators. LRCC conducts technical programs for radio, television, civic groups, and schools to improve public awareness of mining.

State and Local Programs Related to Land Disposal Activities

* Technical Assistance

S. C. Department of Health and Environmental Control, Bureau of Solid and Hazardous Waste provides technical assistance to municipalities, counties, and industry in designing and operating landfills to protect surface and groundwater quality.

A guidance document compiling updated BMPs for land application of treated wastewater and sludge is being developed by DHEC's Bureau of Water Pollution Control. Technical guidance will be given for use of the consulting community in order to facilitate proper geohydrological design of land application systems regarding protection of groundwater quality. A similar document titled Land Application of Sludge is currently available.

* Regulatory Programs

Regulatory authority over solid waste disposal activities resides with S. C. Department of Health and Environmental Control, Bureau of Solid and Hazardous Waste. Bureau staff provides technical assistance to municipalities, counties, and industry in designing and operating landfills in a more effective manner.

Disposal of solid waste is regulated through the domestic and industrial solid waste regulation promulgated under authority of Section 44-1-140 of the South Carolina Code of Laws, 1976, and the South Carolina Pollution Control Act. These statutes require that all solid waste disposal facilities obtain a written authorization (permit) from DHEC prior to commencing operation. Application for a permit includes submission of a comprehensive engineering report which requires use of best management practices and addresses such items as site specifications, potential pollution hazards, geological and hydrological conditions, and other relevant factors which enter into site design, construction, and operation. All permitted sites are closely monitored and inspected on a regular basis to ensure compliance with State regulations. Facilities which do not meet State standards are sent a compliance schedule either to correct deficiencies or close the site.

S. C. Department of Health and Environmental Control, Bureau of Water Pollution Control regulates land application of treated effluent and land application of sludge through its permitting programs. The most common method of applying wastewater is by spray irrigation. Treated effluent is sprayed through nozzles and infiltrates and/or percolates into the ground at a disposal site. Most of the water is evaporated into the atmosphere, and nutrients are taken up by plants growing on the site. State construction and operating permits are required for these facilities. The permitting group applies criteria set forth in <u>Minimum Site Suitability Requirements for Spray Irrigation of Domestic Wastewater</u> which serve to protect Class GB (suitable for drinking water supply) groundwater standards. Also, S. C. Coastal Council reviews these permits and may apply practices set forth in their <u>Stormwater Management Guidelines</u>.

The individual sewage treatment and disposal (ISTD) systems program is regulated by S. C. Department of Health and Environmental Control, Bureau of Environmental Health, Division of General Sanitation. Construction of ISTD systems is strictly regulated in accordance with standards set forth in State Regulation 61-56, Individual Waste Disposal Systems; State Regulation 61-56.1, License for Contractors Constructing On-Site Sewage Treatment and Disposal Systems; and State Regulation 61-57, Rules and Regulations Governing the Development of Subdivision Water Supply and Waste Disposal Systems. These regulations govern the design, construction, and installation of ISTD systems. ISTD systems are not permitted if soil, water table, rock, and other conditions do not meet minimum site criteria. Statewide, approximately three percent of ISTD system permit applications are denied annually, but the rate increases to ten percent along the coast because of high water tables and impermeable clay soils. ISTD systems are not allowed if sewer connection is accessible, and septic tank effluent may not be discharged to any stream or other waterbody.

*Education and Information

Recognizing the need for solid waste disposal solutions, the South Carolina Legislature formed a Solid Waste Task Force. It is made up of seventeen members representing the public and private sectors and is composed of legislators, legislative appointees, and Governor's appointees. The Task Force is considering several options concerning waste recycling and resource recovery (generation of energy from waste material). One of these options is to make recycling mandatory. A tax would be charged on all non-recyclable containers.

S. C. Department of Health and Environmental Control, Division of General Sanitation has initiated educational and training efforts in several areas. District and county ISTD program personnel are trained and certified to identify soil texture, rock, restrictive horizons, and seasonal high water table indicators to accurately evaluate sites for system installation. Contractors must pass an examination before receiving a required license to install ISTD systems. Subdivision of land is evaluated and approved prior to sale, for the best possible method of water and sewage treatment and disposal.

ISTD system educational materials are available for public distribution and use. A booklet titled Individual Sewage Treatment and Disposal in South Carolina explains in layman's terms how a septic tank (ISTD) system works and a brochure titled Getting to Know Your Septic System explains proper maintenance procedures.

*Research/Monitoring

In cooperation with the University of South Carolina, the Division of General Sanitation is currently conducting research of conventional, alternative conventional, and innovative/alternative ISTD systems to assess their workability and to what extent current standards and practices are not adequately protecting surface and subsurface waters. The study will also identify new technologies which will allow use of ISTD systems on otherwise unsuitable sites. Results of the research are expected before 1992.

State and Local Programs Related to Hydrologic/Wetlands Modification

* Regulatory Programs

1. State Budget and Control Board Permit for Construction in Navigable Waters

As set forth in Regulation 19-450, S. C. Code of Laws 1976, a permit issued by S. C. Budget and Control Board is required for any construction, alteration, dredging, filling, flow alteration, or other activity, unless expressly exempted, when such activity involves or will involve use of any navigable waterway of the State. On behalf of the S. C. Budget and Control Board, S. C. Water Resources Commission serves as coordinating agency in administering permit procedures. Where applicable, issuance of the State permit may be conditioned upon approval of such additional licenses, permits, or authorization by the responsible State agencies.

In those instances where the applicant must obtain federal authorization from the U. S. Army Corps of Engineers under Sections 9, 10, 13, or other relevant provisions of the River and Harbor Act, or Section 404 of P. L. 100-4, the Clean Water Act, notice of applications are jointly issued by this federal agency and the State and no separate application is required for the State permit. Where State and federal jurisdictions coincide, application to the federal permitting agency constitutes automatic application to the State.

S. C. Water Resources Commission is charged with notifying relevant State agencies of permit applications and seeking and evaluating such agencies' comments on the applications. Each agency is considered to be individually responsible for their area of interest. Based on the evaluation of comments from other agencies and their own findings, S. C. Water Resources Commission may recommend denial, conditional approval, or approval of the permit to the S. C. Budget and Control Board. The Commission is prohibited from recommending a permit for any activity which S. C. Department of Health and Environmental Control determines would violate State Water Classification and Standards or endanger the public health or where consistency certification is denied by S. C. Coastal Council.

The method of implementing Best Management Practices is by stipulating those erosion or sediment controls or other requirements which must be met on the permit. These controls are applied on a case-by-case basis, based on the project. A substantial number of permits are issued annually which contain specific erosion or siltation conditions requested by S. C. Department of Health and Environmental Control, S. C. Wildlife and Marine Resources Department, S. C. Coastal Council, or S. C. Water Resources Commission for protection of water quality or fish and wildlife habitat within navigable waters.

The S. C. Budget and Control Board permit regulates all activities related to hydrologic modification. Jurisdiction excludes, however, those activities which take place beyond the navigable waters of South Carolina, i.e., those waters defined as non-navigable and those wetlands which are above the ordinary or mean high water mark of a watercourse unless such activities directly and significantly affect a State navigable waterway.

2. Coastal Council Permit

The Coastal Zone Management Act authorizes S. C. Coastal Council to promulgate regulations concerning hydrologic modification within the critical saltwater zone of the State's coastal counties. These regulations are set forth in "Permitting Rules and Regulations." S. C. Coastal Council was created by the 1977 South Carolina Coastal Management Act to protect the quality of the coastal environment and to promote the economic and social improvement of the coastal zone and of all the people of the State. On September 29, 1977, permitting authority of S. C. Budget and Control Board in the Coastal Zone of the State was transferred to S. C. Coastal Council. After this date, no person may utilize a critical area for a use, unless expressly exempted, other than the use the critical area was devoted to on that date unless he first obtain a permit from S. C. Coastal Council. No person shall fill, remove, dredge, drain, or erect any structure or in any way alter a critical area without such a permit.
Critical areas include: (1) coastal waters, (2) tidelands, (3) beaches, and (4) beach/dune system (the area from the mean high water mark to the setback line as determined in Section 48-39-280 of the 1988 Coastal Zone Management Act). The Coastal Zone, or the area of the State under planning jurisdiction of S. C. Coastal Council, includes all coastal waters and submerged lands seaward to the

State's jurisdictional limits and all lands and waters in the counties of the State which contain one or more of the critical areas. The counties are Beaufort, Berkeley, Charleston, Colleton, Dorchester, Horry, Jasper, and Georgetown. The regulations establish specific project standards for docks and piers; boat ramps; bulkheads and seawalls; cables, pipelines, and transmission lines; marinas; highway, road, and bridge construction; dredging and filling; navigation channels and access canals; deposition of dredged material; sewage lagoons or impoundments; marsh impoundments for recreational commercial activities; and drainage canals or ditches. S. C. Coastal Council has also prepared and implements "Stormwater Management Guidelines." This document is organized in two major sections. The first section describes types of activities which are regulated and corresponding requirements and restrictions. Criteria such as location, lot coverage, and land use determine permit requirements. A chart at the end of the section summarizes the activities which require stormwater management and which BMPs and controls are required for each activity. The second section presents basic design standards and requirements for stormwater management systems. Requirements for retention and detention systems with their corresponding design criteria are discussed. It also outlines other best management practices necessary for managing stormwater and includes discussions on such topics as freshwater wetlands stormwater management systems and sediment and erosion control practices.

S. C. Coastal Council regulations are very similar to S. C. Budget and Control Board regulations and adequately regulate hydrologic modification activities which have a potential for degradation of water quality in the Coastal Zone of South Carolina. Unlike S. C. Budget and Control Board jurisdiction, the S. C. Coastal Council program includes all waters and adjacent wetlands within the saline areas. All projects requiring State and federal permits in the Coastal Zone must be consistent with the Coastal Zone Management

Program. The regulations and specific project standards provide a structure for application of Best Management Practices.

3. DHEC 401 Water Quality Certification

S. C. Department of Health and Environmental Control, Bureau of Water Pollution Control, reviews applications for inclusion of best management practices, when and where needed, on federal permits for certain types of activities in and around waterbodies. Section 401 of the federal Clean Water Act requires that all applicants for a federal permit or license which may result in a discharge to navigable waters obtain certification from DHEC. The certification ensures that the project will be conducted in a manner which will not violate State water quality standards. The Department issues certification for primarily three types of projects: U. S. Army Corps of Engineers Section 10 (navigation), Section 404 (dredge and fill permits/U. S. Coast Guard permits, and Federal Energy Regulatory Commission licenses for hydroelectric projects. These activities are categorized as hydrologic modification. Certification is routinely issued with conditions which become part of the federal permit or license. These conditions usually address nonpoint pollution sources, especially sediment loss and stormwater impacts to a waterbody. The Department also routinely reviews plans for highway and utility line construction. Certification conditions include that effective nonpoint control measures be implemented during and after construction to minimize sediment loss to affected waterbodies. DHEC must also certify S.C. Budget and Control Board permits and Coastal Council pemits. Without that certification, those permits cannot be issued.

* Education and Information

Governor Carroll A. Campbell, Jr., of South Carolina, served as a member of the National Wetlands Policy Forum. In response to recommendations from the National Forum, Governor Campbell established a State Forum to develop a

Wetlands Policy for South Carolina. His goals are to define wetlands, identify and inventory wetlands in South Carolina, and provide protection to these areas. Governor Campbell supports the National Forum goal of "No net loss of the nation's remaining wetlands base." The State Forum is comprised of representatives from the legislature, agriculture, State regulatory agencies, industry, and environmental interest groups. Recommendations concerning NPS for the Forum will be incorporated into the NPS Management Program.

S. C. Sea Grant Consortium supports research pertaining to wetlands. They provide scientific information to regulatory and management agencies as well as educational information to the general public. The Consortium is preparing educational material on the function and value of wetlands including a video tape, slide presentation, and brochure. One aspect of these educational materials will discuss how NPS pollution threatens the valuable wetlands resource. NPS funds are being used to partially finance this project. It will be utilized as part of the NPS Management Program. The S. C. Sea Grant Consortium publishes a quarterly newsletter titled Coastal Heritage. This publication has a readership of several thousand.

Cross Category State and Local Programs

* Financial Assistance

The South Carolina Heritage Trust is a program within the S. C. Wildlife and Marine Resources Department. Its primary functions are to inventory, evaluate, and protect significant natural areas and critical sites which harbor rare or endangered species. Through donation, acquisition, by purchase, or registration, the lands that are entered into the Heritage Trust Program are protected by the State and are maintained in their natural conditions. Prohibition of further development along with eliminating the application of pesticides and fertilizers on these lands significantly reduces the chances of nearby streams, rivers, lakes, estuaries, or wetlands becoming polluted by nonpoint sources.

*Education/Information

The Charleston Harbor Estuary Citizen's Committee is a group of concerned individuals whose primary goals are to maintain and enhance water quality in Charleston Harbor by raising public awareness of sources of possible pollution such as point sources, urban stormwater runoff, and other sources of NPS pollution. There is a NPS Subcommittee whose specific interests lie in identifying problems and offering alternative solutions. A member of this subcommittee is also a member of the NPS Task Force. Recommendations of the NPS Subcommittee will be incorporated into the NPS Management Program where applicable.

The South Carolina Water Watch Program is an intra-agency and citizen's group effort coordinated through the Governor's Office and the South Carolina Water Watch Committee. This program provides individuals with a hands-on opportunity to learn more about their water resources. The more working experience citizens have with their community's water resources, the better they can detect problems, form opinions, and express their views. The basic components of the Water Watch Program are awareness, education, and action. Through Water Watch projects, active citizens can voice their concerns to federal, State, and local officials, industry, and operators of municipal water and wastewater treatment facilities. A well informed citizenry that understands and supports pollution prevention programs and more efficient treatment facility operations acts as an early pollution detection system and helps ensure their community dollars are being spent wisely. Most of the work performed by local groups participating in this program have consisted of water quality monitoring and assessment, although some projects have been involved with NPS pollution. These efforts have consisted of monitoring sedimentation problems in streams, reporting them to appropriate State agencies, and working with local governments in land use planning around streams. The NPS Management Program plans to utilize this group in public education and information efforts.

Project Wild Aquatic is a national wildlife conservation educational program facilitated through S. C. Wildlife and Marine Resources Department. SCWMRD personnel conduct workshops for both elementary and secondary teachers and facilitators. In these workshops, instruction for teaching Project Wild Aquatic curricula in the classroom is given. SCWMRD personnel are currently in the process of developing some supplemental curricula to accompany the standard workbook which are more localized to South Carolina in scope. This would be an excellent avenue through which NPS education could be provided to our teachers to pass on to our school children.

Project Learning Tree is another national program implemented by a State agency. S. C. Forestry Commission facilitates this program, which is primarily oriented toward education about trees. It is very similar to Project Wild Aquatic in organization and goals. It would be an excellent vehicle through which education about potential NPS problems from silvicultural activities could be provided.

*Research/Monitoring

S. C. Department of Health and Environmental Control conducts two related monitoring programs which benefit the NPS Management Program. Long-term trend monitoring is accomplished through the Fixed Monitoring Network which consists of Primary Stations, Secondary Stations, Sediment Stations, Basic Water Monitoring Program Stations, and Biological Monitoring Stations. Data collected by this Network are used in development of designated use classifications and water quality standards, which are in turn used to establish specific waterbody use classifications. Review of these trend data help determine if existing water quality is adequate to protect existing and designated uses and if appropriate standards have been set. The trend monitoring network established a basis for the NPS Assessment. Special Intensive Surveys are designed to address and answer special concerns such as NPS impacts. They are used to assess current conditions, substantiate enforcement decisions, follow up specific actions, respond to complaints, or short term problems. They are often initiated to investigate apparent problems indicated by trend monitoring data and to determine the cause of non-support of designated uses. The data typically collected during such surveys can be physical and chemical water quality parameters, hydraulic stream characteristics, biological sampling, effluent and compliance sampling, and toxicity testing. Several intensive surveys will be conducted during the Program for assessment and evaluation purposes.

The South Carolina Water Resources Research Institute is a unit of Clemson University. Its objectives are to evaluate research needs, motivate and support research by qualified scientists, and provide for technology transfer. This Institute has funded five scientific studies dealing with various aspects of NPS pollution in South Carolina. Recent studies have involved pesticide runoff from tomato fields and stability of particles on steep slopes. SCWRRI plans to continue and expand its involvement with research of NPS problems. Results of this research will be incorporated into the NPS Management Program where applicable.

Stream surveys have been conducted by S. C. Wildlife and Marine Resources Department, Freshwater Fisheries Section since the early 1970's. The information gathered consists primarily of a list of fish species, substrate type, basic water quality data, and surrounding land use. Well over 1000 streams have been surveys primarily on a one-time basis. At present, the data is stored in a computer database, and SCWMRD staff is working to have it entered into a geographical information system (GIS). Also, methods of changing and improving collections are being investigated. When a stream is designated for action by the NPS Task Force, it would be appropriate, in many cases, for SCWMRD Freshwater Fisheries personnel to update the stream database within the existing SCWMRD program. More extensive studies could also be undertaken as a cooperative effort with DHEC and/or other appropriate agencies. If a stream is designated for NPS action in which no survey has been conducted, this would certainly be justification to do so.

CHAPTER 9

FUTURE PROCESSES

The NPS Management Program, first developed in August 1988 and revised in May 1989, includes a schedule containing annual program goals and milestones for a four-year program designed to reduce nonpoint source impacts from the major pollutant categories. This program will expand upon and update the existing management program. A Nonpoint Source Task Force consisting of representatives of agencies regulating NPS or having related programs has been established to assist in formulation and implementation of the program.

The NPS Assessment identifies waterbodies in South Carolina impacted by nonpoint source pollution and the category of that NPS. It does not, however, attempt to identify specific source(s) of pollution. The NPS Assessment list of waterbodies has been prioritized based on several factors which are discussed in the Management Program document. High priority waterbodies are targeted for further NPS evaluation or control programs. Types of additional assessment which may be made, depending on needs, include:

1. Prepare annual NPS progress reports which will include updates of assessment activities.
2. Develop a Statewide groundwater monitoring network to assess NPS pollution impacts and water quality improvements resulting from BMP implementation.
3. Monitor effects of agricultural practices, including best management practices, on groundwater.
4. Accumulate information on concentrations of pesticides in surface water and groundwater through computer modelling. Models can

determine potential concentrations of this pollutant, including areas which do not exhibit significant soil loss but are close to sensitive waters.

5. Develop and implement a comprehensive and flexible biological and water quality monitoring program and methodology to evaluate the impact of NPS pollution and the effectiveness of BMPs in improving degrading water quality or preventing NPS impacts.
6. Evaluate, in targeted waterbodies, improvements/benefits in biological communities and/or water quality or water use.
7. Monitor and assess NPS pollutant load reductions in selected targeted sites before and after implementation of BMPs. Evaluate cost effectiveness of such programs in targeted areas.
8. Update target watershed/waterbody lists based on consideration of new NPS assessment information or study date.
9. Continue to utilize predictive modelling techniques, such as a Geographic Information System (GIS), to identify and rank land areas for potential NPS impact on waterbody biointegrity and water quality.
10. Evaluate South Carolina coastal waterbodies for NPS impact using DHEC bacteriological data from fixed shellfish monitoring stations.
11. Study the cumulative effect of runoff on drainage basins. Flowing water may dilute NPS pollutants, while cumulative effects on downstream receiving waters can be significant, resulting in NPS accumulations which are far away from the sources. This process could influence identification of areas selected for controls as well as selection of the control methods, e.g., controls at downstream receiving waters versus controls at the sources.
12. Increase information on content of nutrients in surface runoff. This would involve the use of soil test data in conjunction with computer

modelling to determine the potential of nutrient delivery to waterbodies.

13. Quantify streambank erosion and its effect on water quality.

CHAPTER 10

PUBLIC PARTICIPATION

The U. S. Environmental Protection Agency's Nonpoint Source Guidance specifies that other agencies and groups with water quality and resource interests be actively involved in identifying NPS water quality problem areas and the sources impacting these waters. Further, the State shall issue a public notice on the availability of the Assessment Report for public review and provide opportunity for comment prior to submitting the final report to EPA.

We solicited and received input to the Assessment from several State and federal agencies having NPS related programs. The S. C. Land Resources Conservation Commission played a major role in the development of the Assessment through provision of the methodology for identification of potential NPS problem areas. South Carolina Coastal Council identified several coastal problem waterbodies for the Assessment list, and the 46 local Soil and Water Conservation Districts were given the opportunity to contribute NPS problem areas to the list. We also sent copies of the draft Assessment to State NPS Task Force members and the Soil and Water Conservation Districts for review and comment. The Task Force provides policy and direction for the NPS program. Membership is shown in Table D.

The interested public also had opportunity to provide input to the Assessment list and opportunity to comment on the draft version of the Assessment document. Copies of the survey shown in Appendix II were sent to 38 individuals and interest groups. The group names were supplied by the Governor's Office of Energy, Agriculture, and Natural Resources and included local chapters of the Sierra Club, Trout Unlimited, and other related

TABLE D

NPS TASK FORCE

1. Division of Marine Resources, S. C. Wildlife and Marine Resources Department
2. U. S. Fish and Wildlife Service
3. S. C. Forestry Commission
4. U. S. Forest Service
5. Charleston District, U. S. Army Corps of Engineers
6. Department of Agricultural Engineering, Clemson University
7. Department of Fertilizer and Pesticide Control, Clemson University
8. S. C. Land Resources Conservation Commission
9. S. C. Water Resources Commission
10. S. C. Coastal Council
11. Soil Conservation Service, U. S. D. A.
12. S. C. Sea Grant Consortium
13. Division of Energy, Agriculture, and Natural Resources, Office of the Governor
14. Wildlife and Freshwater Fisheries, S. C. Wildlife and Marine Resources
15. Department of Civil Engineering, University of South Carolina
16. Agricultural Stabilization and Conservation Service, U. S. D. A.
17. Agricultural Extension Service, Clemson University
18. U. S. Geological Survey
19. State Advisory Council on Erosion and Sediment Reduction
20. S. C. Wildlife Federation
21. Bureau of Solid and Hazardous Waste, D. H. E. C.
22. Bureau of Water Pollution Control, DHEC
23. Bureau of Water Supply and Special Programs, DHEC
24. Bureau of Environmental Sanitation, DHEC

organizations. Respondents were asked to supply names of waterbodies that are known to be affected by NPS. The response rate was approximately 35 percent. The waterbodies named by the respondents were added to the Assessment list.

The draft Assessment was placed in each of the 12 DHEC Environmental Quality Control offices around the State for public review. A public notice was prepared and sent to four newspapers: The State (Columbia), Greenville News, Charleston News and Courier, and Florence Morning News. It was also sent to approximately 400 individuals and groups which receive public notices on other Departmental matters such as Section 401 Certifications. A copy of this public notice is exhibited in Appendix III. It explains the purpose and content of the Assessment, lists where it is available for review, and explains how and when to submit comments. The notice appeared in the above mentioned newspapers on July 5. Mailing list recipients received it on or before that date. The comment period closed on August 3, thirty days later.

We received ten written replies commenting on the draft within the thirty day period. Several commentators wished to add waterbodies to the Assessment list. We added them in most cases. Several commentators wished to add water quality parameters to the sampling regime. We will consider adding them when further NPS sampling is conducted for those parameters for which the DHEC laboratory has analysis capability. A few commentators recommended stormwater sampling, correlation of water quality data with antecedent rainfall data, or biological studies. Again, we will consider these methodologies when further assessment is carried out. Two commentators questioned the inclusion of landfill leachate and underground storage tanks as nonpoint sources. These categories were included because EPA guidance includes them. A number of commentators questioned some of the standards or criteria limits employed for inclusion of NPS impacted waterbodies on the Assessment list. We reviewed our procedures concerning some of these limits and agreed that some changes were necessary. The data were reviewed again based on these changes. Also it was discovered that some errors occurred in Appendix I, NPS Water Quality Parameters. These errors were corrected. Finally, several commentators recommended citizen representation on the NPS Task Force. We added representatives from S. C. Wildlife Federation and the State Advisory Council on Erosion and Sediment Reduction.

On December 22, 1988, the Environmental Protection Agency issued Public Notice Number 88-NPS-01-SC requesting public comment on the State of South Carolina's proposed NPS Assessment report and NPS Management Program. A copy of the public notice is included in Appendix III. The public comment expiration date was January 22, 1989. Comments on the Program were sent to EPA for their review and forwarded to DHEC NPS staff. No comments pertaining to the Assessment were received by DHEC staff during the comment period.

APPENDIX I

NPS WATER QUALITY PARAMETERS

Parameter	Standard or (Criterion)	Source
Dissolved Oxygen	5 mg/l minimum	1
Suspended Solids	50 mg/l	2
Turbidity	20 mg/l	2
pH	6 - 8 standard units	1
Fecal Coliform	400 organisms/100 ml	1
Biochemical Oxygen Demand (5-day)	5 mg/l	2
Ammonia	.025 mg/l (as un-ionized ammonia)	3
Total Phosphorus	.1 mg/l	3
Nitrate-Nitrite	1 mg/l	2
Conductivity	500 mhos	2
Iron	1 mg/l	2
Lead	.05 mg/l	4
Cadmium	.01 mg/l	4
Chromium	.05 mg/l	4
Zinc	.05 mg/l	4
Nickel	.05 mg/l	4
Copper	.05 mg/l	4
Mercury	.2 ug/l	4
DDT	.05 ug/l	4
Aldrin	.05 ug/l	4
Endrin	.05 ug/l	4
Dieldrin	.05 ug/l	4
Toxaphene	.05 ug/l	4
Heptachlor	.05 ug/l	4
Malathion	.05 ug/l	4
Diazinon	.05 ug/l	4
Phosdrin	.1 ug/l	4
Acid Extractable Organics	4.0 ug/l	4
Volatile Organics	2.0 ug/l	4
Guthion	.1 ug/l	4
Trithion	.1 ug/l	4

Sources:

1. South Carolina Department of Health and Environmental Control Regulation 61-68, Water Classification Standards System. 1985.

2. South Carolina Department of Health and Environmental Control Criteria based on consideration of existing STORET data.

3. United States Environmental Protection Agency, Quality Criteria for Water.

4. Lower limit of detection by DHEC laboratory.

APPENDIX II

NONPOINT WATERBODY SURVEY FORM

County________________________ Completed by________________________

Are there significant impacts from NPSs in your area?	List specific waterbodies (streams, stream segments, lakes or impoundments) impacted by NPSs.	If there are effects list effect(s) from Table A.*	If there are impacts list source(s) from Table B.*	List existing uses from Table C.*	List potential uses from Table C.*
yes no unknown	1				
	2				
Are there likely to be future NPS problems?	3				
yes no	4				
unknown	5				

Comments:

List additional comments, waterbodies, the NPS effects, sources and the uses on back of survey form.

Table A

If the effect is:	Indicate:
Oxygen depletion	1
Lake/impoundment eutrophication	2
Coliform bacteria contamination	3
Sedimentation	4
Toxicity due to pesticides, heavy metals, etc.	5
Turbid conditions	6
Physical habitat degradation	7
Unknown	8
Other	9

Table B

If the source is:	Indicate:
Urban runoff	A
Agricutural pesticide application	B
Agricultural fertilizer application	C
Agricultural soil erosion	D
Silvicultural activies	E
Mining activities	F
Onsite septic systems	G
Animal Wastes	H
Residential Fertilization activities	I
Hydromodification	J
Construction site soil erosion	K
Unknown	L
Other	M

Table C

If the use or potential use is:	Indicate:
Fishing (poor)	S
Fishing (moderate)	T
Fishing (good)	U
Fishing (unique)**	V
Swimming (poor)	W
Swimming (good)	X
Unknown	Y
Other	Z

*Select as many effects, sources, or uses that apply.

**Consider a fishery unique if it represents a species uncommon to the County such as a trout fishery where warmwater conditions normally prevail or the waterbody supports an endangered or rare species.

APPENDIX III

PUBLIC NOTICE

State of South Carolina
Department of Health and Environmental Control
Bureau of Water Pollution Control
2600 Bull Street
Columbia, South Carolina 29201
(803)734-5300

PUBLIC NOTICE NO.: 1 DATE: July 5, 1988

NOTICE TO RECEIVE PUBLIC COMMENT ON
STATEWIDE NONPOINT SOURCE ASSESSMENT

In compliance with Section 319(a) of the Clean Water Act of 1987, the Department of Health and Environmental Control has prepared a Statewide Nonpoint Source Assessment. This document lists waterbodies (both surface and ground) that are impacted or potentially impacted by nonpoint source pollution (NPS). NPS differs from point source pollution in that it does not emanate from a discrete source such as a pipe. Examples of NPS include runoff from a plowed field, construction site, or parking lot, and leachate from landfills or failing septic tanks. The list identifies the impacted waterbody and its watershed, the type of pollutant or pollutants impacting the waterbody, and the source (or category) of the NPS pollution. The Assessment also discusses the process for defining best management practices for controlling the NPS and identifies programs both regulatory and nonregulatory that will be employed to achieve implementation of best management practices.

This "draft" document is tentative and open to comment from the public. Persons wishing to comment are invited to submit same in writing within thirty (30) days of the date of this Notice to South Carolina Department of Health and Environmental Control, 2600 Bull Street, Columbia, SC 29201, ATTN: NPS Coordinator, Division of Water Quality and Shellfish Sanitation. All comments received by August 3, 1988, will be considered in the formulation of the "final" report.

Copies are available for public review at the 12 Department of Health and Environmental Control Environmental Quality Control District Offices during normal office hours. The locations of these offices are:

Appalachia I EQC Office
220 McGee Road
Anderson, SC 29621

Appalachia II EQC Office
605 North Main Street
Greenville, SC 29601

Appalachia III EQC Office
151 East Wood Street
Spartanburg, SC 29304

Catawba EQC Office
1001 West Grace Street
Lancaster, SC 29720

Central Midlands EQC Office
Pearl Lightsey Building
State Park, SC 29147

Low Country EQC Office
149 Ribaut Square
Beaufort, SC 29902

Lower Savannah EQC Office 117 Marion Street, N.E. Aiken, SC 29801	Pee Dee EQC Office 3204 Industry Boulevard Florence, SC 29501
Trident EQC Office 1000 Air Park Road Charleston Hgths, SC 29418	Upper Savannah EQC Office P-129 One Park Avenue Greenwood, SC 29646
Waccamaw EQC Office 1705 Oak Street Plaza Myrtle Beach, SC 29577	Wateree EQC Office 105 North Magnolia Street Sumter, SC 29151

Please bring the foregoing to the attention of persons who you know will be interested in this matter.

United States Environmental Protection Agency
Region IV
345 Courtland Street
Atlanta, Georgia
Attention: Ms. Beverly Ethridge
(404) 347-2126

NOTICE OF RECEIPT BY THE U.S. ENVIRONMENTAL PROTECTION AGENCY OF, AND REQUEST FOR PUBLIC COMMENT ON, THE STATE OF SOUTH CAROLINA'S PROPOSED NONPOINT SOURCE ASSESSMENT REPORT AND MANAGEMENT PROGRAM

Public Notice No: 88-NPS-01-SC
Public Notice Issuance Date: December 22, 1988
Public Comment Expiration Date: January 22, 1989

Pursuant to Section 319 of the Clean Water Act, the U.S. Environmental Protection Agency (EPA) is hereby notifying the public of its receipt of, and requesting comments on, a proposed Nonpoint Source (NPS) Assessment Report and NPS Management Program for the State of South Carolina.

1. Background

NPS Assessment Reports identify navigable waters within the State which, without further action to control NPS pollution, will not attain or maintain water quality standards. State NPS Management Programs set forth the States' four-year plans for addressing nonpoint sources of pollution. These sources include discharges other than those through confined and discrete conveyances (such as pipes or ditches), and all agricultural stormwater discharges and irrigation return flows. Major nonpoint sources may include, for example, agricultural runoff containing pesticides and fertilizers, runoff from urban areas, and construction projects.

State NPS Assessment Reports must include the following: (a) waters within the State impacted by nonpoint sources; (b) the categories or types of nonpoint sources which contribute pollutants to these State waters; (c) the process used for identifying best management practices (BMPs) to control NPS pollution; and (d) the State and local programs for controlling nonpoint sources.

State NPS Management Programs must include the following: (a) an identification of the BMPs and measures which will be undertaken to reduce pollutant loadings; (b) an identification of the programs to achieve implementation of the BMPs; (c) a schedule containing annual milestones for program implementation; (d) a certification of the State attorney general that the laws of the State provide adequate authority to implement the program; (e) sources of federal and other assistance and funding to support implementation; and (f) an identification of federal financial assistance programs and federal development projects the State will review for consistency with its Management Program.

EPA will, within 180 days of its receipt of a proposed NPS Assessment Report or Management Program, either approve or disapprove a NPS Assessment Report or Management Program or a portion of a NPS Management Program. EPA will determine whether the criteria for program approval in Section 319(d)(2), (A)-(D) have been met. In the event that the proposed Program or portion of a Program is disapproved, the State must submit a revised Program to EPA within three months, and EPA must either approve or disapprove the Program or portion of a Program within a subsequent three month period. If EPA disapproves a proposed Assessment Report, it will allow the State an opportunity to revise the Report in accordance with EPA comments. If an approvable revised Report is not submitted to EPA in a timely fashion, EPA will, after public notice and opportunity for comment, prepare an Assessment Report for that State.

2. Public Comments

Persons wishing to comment on the State of South Carolina proposed NPS Assessment Report and NPS Management Program may do so in writing, within 30 days of the date of this public notice. Comments must be received within the 30 day period to be ensured consideration in the EPA approval or disapproval decision. All comments should include the name, address and telephone number of the commenter and a statement of the relevant facts upon which it is based.

All written comments should be submitted to EPA at the above address to the attention of Ms. Beverly Ethridge, Nonpoint Source Coordinator.

The State of South Carolina's proposed NPS Assessment Report and NPS Management Program may be reviewed at the above address between 8:30 a.m. and 4:00 p.m., Monday through Friday. Copies may be reviewed at the address shown below or copies may be requested by writing:

South Carolina Department of Health & Environmental Control
Environmental Quality Control
2600 Bull Street
Columbia, South Carolina 29201

by calling (803) 734-4880.

APPENDIX IV

ASSESSMENT OF
NONPOINT SOURCE POLLUTION
BY SEDIMENT

Submitted to

South Carolina Department of Health

and Environmental Control

In Partial Fulfillment of Section 319

of the

Water Quality Act of 1987

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by

South Carolina Land Resources Commission

April 12, 1988

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Nonpoint Source Category and Source Identification

ABSTRACT

To define potential nonpoint source pollution problems in South Carolina, the S.C. Land Resources Conservation Commission (SCLRCC) used a geographic information system (GIS) and a sediment yield model (SEDCAD^{+}) developed by the Earth Resources Data Analysis Systems, Inc. (ERDAS) and the University of Kentucky, respectively. Statewide estimates of sediment yield were derived by combining four spatial data sets (i.e., watershed boundaries, land use/land cover, soil, and hydrology) to develop inputs required by the sediment yield model. As a result of the analysis, hydrologic units, by watershed, were separated into six Major Land Resource Areas (MLRA) and, upon completion of the analysis phase, were further subdivided into four distinct "potential" sediment yield categories.

INTRODUCTION

Using ERDAS and SEDCAD^{+} computer software, estimates of potential sediment yield were calculated for each of the 280 watersheds recognized by the USDA, Soil Conservation Service (SCS). To accomplish this task, the SCLRCC incorporated into a GIS the natural resource information needed to generate the required inputs for the sediment yield model.

A GIS is designed to incorporate large volumes of spatial data into a single or a series of outputs which, subsequently, can be used in the decision making process. Therefore, the natural resource data needed for this analysis were entered into the computer by importing or digitizing each of the four datasets and storing these data in an

IBM-AT microcomputer. The computer records the digitized features as a series of X,Y coordinates and, using the ERDAS software, these data were converted into grid cells with a resolution of 200 m by 200 m (9.88 acres).

The equipment used to perform the GIS analysis included an IBM-AT computer with a 310 megabyte hard drive, a Calcomp 9100 series digitizing tablet, a Mitsubishi high resolution color monitor, a Bernoulli data storage system, a Tektronix 4696 ink jet color printer, an Okidata text printer and the ERDAS software. Two additional IBM-AT computers and an IBM 0S1-Model 80 were used for data management and sediment yield modeling.

OBJECTIVES

The objective of this study was to identify potential nonpoint source pollution contributors, by watershed, using the GIS capabilities of the ERDAS software and the sediment yield modeling capabilities of the SEDCAD$^+$ software. Three sub-objectives were used to attain this goal:

1. combine soil, land use/land cover,and hydrologic information for each of 280 watersheds within the state using a GIS;
2. develop statistical output from the GIS for use in the sediment modeling phase of the project; and
3. develop a procedure to compare potential sediment yields for each watershed, by MLRA.

This study is not intended to address the <u>absolute</u> observed sediment discharge from each watershed. Instead, a <u>relative</u> comparison of potential sediment yield, by watershed, serves to assess those watersheds that may contribute to the state's nonpoint source pollution problem. Since, a sediment standard does not exist in South Carolina, a relative comparison of potential sediment yield between watersheds is assumed to be an acceptable procedure for identifying potential nonpoint source pollution contributors.

LITERATURE REVIEW

Erosion Mechanics

The most prominent equation for predicting erosion (tons/acre) is the Universal Soil Loss Equation (USLE),

$$A = R\ K\ LS\ C\ P\ . \tag{1}$$

These quantities will be discussed and defined individually.

In 1917 the first erosion plot was established at the University of Missouri Agricultural Experiment Station. By 1943 a large volume of data had been collected and the studies were discontinued. The Musgrave equation was developed at a workshop in Cincinnati, Ohio in 1946. Based on plot studies, this equation related soil loss to slope, slope length, soil cover, conservation practice, rainfall energy and a measure of soil erodibility. Wischmeier and Smith (1965) improved the Musgrave equation and the result became known as the Universal Soil Loss Equation because it did not contain any geographic constraints.

The rainfall factor R accounts for the interrelated erosive forces of rainfall and runoff, since the USLE is a lumped predictor of rill and inter-rill erosion. The best predictor of rainfall erosivity is a function of maximum 30-minute intensity (I_{30}), commonly known as the EI_{30} index,

$$E = 916 + 331\log_{10} I \tag{2}$$

where

I = average intensity of the storm.

The soil erodibility factor K, represents the susceptibility of a soil to erosion. Defined by Wischmeier and Smith (1965) as "the rate of soil erosion per unit of rainfall potential (index) from a unit plot which is tilled up and downslope, and has been kept in fallow for at least two consecutive years." Wischmeier et al. (1971) developed a nomograph which has become the established method of obtaining erodibility values. The following equation defines this nomograph:

$$K = 2.1M^{1.4}(10^{-6})(12-a) + .0325(b-2) + .025(c-3) \tag{3}$$

where

M = (si + vfs),

a = % organic matter,

b = structure code,

c = profile permeability class,

si = % silt,

vfs = % very fine sand.

This is valid for A horizon soils with a silt fraction of less than 70%.

Slope length factor is defined as the distance from the point of origin of overland flow until the point of slope decreases such that deposition occurs or until flow enters a defined channel. The following equation was developed for data on slopes of 3 to 20% and lengths of up to 400 feet;

$$LS = (\lambda/72.6)^{m}[(430x^2+30x+0.43)/6.613] \tag{4}$$

where

λ = slope length,

x = sine of theta,

θ = slope angle.

Exponent m is dependent on slope. This exponent is given by the following:

slope < 3%   m = .3

slope = 4%   m = .4

slope > 5%   m = .5

The SCS has developed a nomograph which has been extrapolated beyond these values. In practice these equations are useful. Irregular slopes of non-uniform shape are sometimes encountered. In such cases modifications are necessary to the base equations as suggested by Wischmeier. Barfield et al. (1980) illustrates this well. However, for this discussion complex slopes need not be considered.

The CP factor accounts for the effects of canopy cover and management practice on erosion amounts. Originally the factors were proposed separately but are typically used as a single factor. Dissmeyer and Foster (1980) have tabulated C and P values for most surface conditions. Several subfactors are used to determine the final control practice factor for a given field situation.

The USLE does not account for deposition. Therefore, erosion rates predicted by this equation could be larger than observed values if deposition occurs. Sediment is detached as either primary particles or as aggregates. Aggregates are transported as bedload, while primary particles may be transported as suspended load or as bed material. The delivery ratio concept can be incorporated to estimate actual sediment yields. A ratio of sediment yield from a watershed and gross erosion from that watershed defines the delivery ratio as

$$D = Y/A \tag{5}$$

where

Y = sediment yield from a watershed,

A = gross erosion from that watershed.

Williams (1976) proposed modifying the USLE to account for transport phenomena. He suggested that the EI_{30} index be replaced by a runoff energy term. Procedures were developed for homogeneous watersheds using a lumped parameter approach and for nonhomogeneous watersheds using sediment routing procedures. The following equation was developed from 778 storms on watersheds near Riesel, Texas and Hastings, Nebraska:

$$Y = 95(Qxq_{pi})^{0.56} K\ LS\ CP \tag{6}$$

where

Y = single storm sediment yield in tons,

Q = runoff volume in acre-ft,

q_{pi} = peak discharge in cfs,

K = erodibility,

LS = slope length factor,

CP = control practice factors,

Qxq_{pi} = runoff energy term,

The USLE terms are weighted averages throughout the watershed for nonhomogeneous situations, Equation 6 is known as the Modified Universal Soil Loss Equation. Prediction accuracy of the MUSLE is shown in Figure 1.

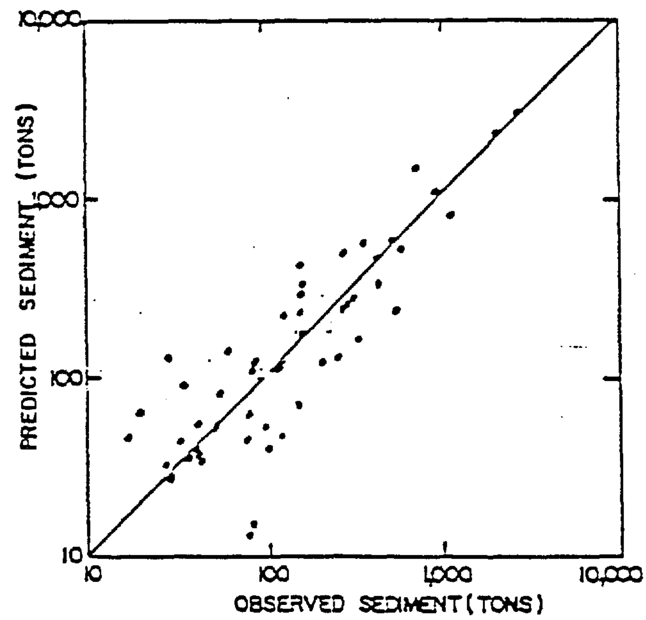


Figure 1. Prediction Accuracy of the Modified Universal Soil Loss Equation (Williams, 1975)

When considering nonhomogeneous watersheds, routing procedures are necessary. First, to account for watershed heterogeneity, the watershed is divided into homogeneous subwatersheds, and the travel time to the exit of the subwatershed is determined. Second, sediment yield for each homogeneous watershed is estimated by Equation 6. Third, the average diameter of sediment particles exiting each subwatershed is determined from an eroded particle size distribution. Finally, the amount of sediment from each watershed that reaches the exit is calculated by assuming that the rate of deposition is proportional to the particle size, sediment load, and travel time. The routing equation in differential form as Equation 7 can be integrated to obtain Equation 8,

$$dY_i/dt = -BY_i(D_{50i})^{.5} \quad . \tag{7}$$

$$Y_i = Y_{oi}e^{-BT_{ti}(D_{50i})^{.5}} \tag{8}$$

where

T_{ti} = travel time to main watershed exit,

D_{50i} = average diameter of sediment

Y_{oi} = yield at the subwatershed exit,

Y_i = sediment that reaches the main watershed exit.

Then the total sediment yield from watershed i can be found from Equation 8. The routing coefficient B is found by trial and error from the following equation:

$$(Qxq_p)_{ws}^{.56} = \sum_{i=1}^{n} (Q_i x q_{pi})^{.56} e^{-BT_{ti}(D_{50i})^{.5}} . \tag{9}$$

This procedure was verified by Williams using data from five storms on a 4380 acre watershed with a slope of two percent at Riesel, Texas. Results are shown in Table 1.

TABLE 1. Comparison of Routed and Measured Sediment Yields for Five Storms on Watershed G, Riesel, Texas (Williams 1975)

Date	Sediment Yield (tons) Measured	Routed	Delivery Ratio	Routing Coefficient
3-29-65	4088	4448	46	6.1
2-9-66	1648	1533	42	8.7
5-10-65	759	848	44	4.9
8-12-66	1332	1067	46	4.4
5-10-65	1890	1470	45	6.4

Eroded Particle Size Distribution

In order to use Equation 9, it is necessary to have a D_{50} value for the sediment exiting the subwatershed. This then becomes an important parameter for deposition determination within the subwatershed. The eroded particle size distribution is needed. Methods have been proposed by Barfield et al. (1980), Rhoton et al. (1982), and Foster et al. (1985) for prediction of eroded particle size distribution. Barfield proposed that a rainfall event may be simulated on a sample of soil in question. This simulation is done using a Tee-jet 80150 nozzle with a 10 foot fall. Runoff from the sample is caught through a sieve stack grading from sand to coarse silt. The remaining suspended sediment is then analyzed for fine silt to clay size particles. This was done using a pipette analysis. This procedure has not been compared with field measurements.

Rhoton et al. (1982) proposed wetting the soil sample by one of two methods. In the first method the sample was allowed to soak for two hours in de-aerated distilled water. The second method was to wet the sample at 4 cm tension. This was done by putting the soil sample on filter paper and placing it on a sponge saturated in an enclosed tray of distilled water. Each sample was allowed to equilibrate overnight, then transferred to a 250 ml Erlenmeyer flask with distilled water for a total volume of 125 ml. These soil suspensions were agitated on an orbital shaker for varying lengths of time at a constant rate of 250 rpm. Immediately after agitation, size distributions were determined using procedures identical to those used in the field. The samples were wet sieved through a stack of 5 sieves with openings of 1000, 500, 250, 125, and 63 um. Material <63 um was transferred to graduated cylinders and separated into four additional sizes of 31, 16, 8, and 4 um. This was done by pipetting after dispersion with hexametaphosphate. Rhoton et al (1982) found that variation increased as sediment size decreased. Seventeen different soil series were tested, all located in the delta and upland areas of northern Mississippi, except for three from Iowa (Clarion, Monona, and Tama). He found that this method of wetting had no significant effect on the prediction of size distribution. However, agitation times were significant in fitting the measured curves within one standard deviation. The best curve match required agitation times of five minutes (Memphis and Sharkey) to 45 minutes (Loring), with most soils falling in the 10 to 20 minute range. Rhoton concluded that an agitation time of 14 minutes is probably satisfactory for most soils. This would predict eroded size distribution within one standard deviation.

Foster et al. (1985) proposed using equations that describe the composition of sediment as a function of primary particles in the matrix soil. The five particle classes used were primary clay, primary silt, small aggregate, large aggregate, and primary sand. Table 2 summarizes the equations for each classification and their size range.

TABLE 2. Revised Creams Equation Summary from Foster et al. (1985) by Barnhisel et al. (1983)

Primary Clay

Average Diameter: 0.002 mm Size Range: < .004 mm

Specific Gravity: 2.65

Fraction of Primary Clay: $F_{cl} = 0.26\ O_{cl}$

Primary Silt Size Range: .004-.063 mm

Average Diameter: .10 mm

Specific Gravity: 2.65

Fraction of Primary Silt: $F_{si} = O_{si} - F_{sg}$

Fine Aggregates

Average Diameter: $D_{sg} = .030$ mm $O_{cl} < .25$ mm

$D_{sg} = 0.2(O_{cl} - .25) + .03$ $.25 < O_{cl} < .6$

$D_{sg} = .10$ mm $O_{cl} > .60$ mm

Specific Gravity: 1.8 Size Range: .004-.063 mm

Fraction of Fine Aggregates:

$F_{sg} = 1.8\ O_{cl}$ $O_{cl} < .25$ mm

$F_{sg} = .45 - .6(O_{cl} - .25)$ $O_{cl} > .5$ mm

Primary Sand

Average Diameter: $D_{lg} = .30$ mm Size Range: > .063

Specific Gravity: 2.65

Fraction of Primary Sand: $F_{sa} = O_{sa}(1 - O_{cl})$

Coarse Aggregate

Average Diameter: $D_{lg} = .30$ $O_{cl} < .15$ mm

$D_{lg} = 2.0\ O_{cl}$ $O_{cl} > .15$ mm

Specific Gravity: 1.6 Size Range: > .063 mm

Fraction of Large Aggregates: $F_{lg} = 1 - F_{cl} - F_{si} - f_{sg} - F_{sa}$

Definitions:

O_{cl} = Fraction of clay in parent material

O_{si} = Fraction of silt in parent material

O_{sa} = Fraction of sand in parent material

F_{cl} = Fraction of primary clay in eroded sediment

F_{si} = Fraction of primary silt in eroded sediment

F_{sa} = Fraction of primary sand in eroded sediment

F_{sg} = Fraction of small aggregates in eroded sediment

F_{lg} = Fraction of large aggregates in eroded sediment

These equations were tested on 28 different soils. A one-tailed t-test yielded significant difference at the 1% level indicating that these equations predict measured particle sizes better than the original Creams equations.

Erosion Modeling

A model is often defined as a mathematical representation of a phenomenon or process. An environmental model is a set of mathematical rules that attempts to describe quantitatively the behavior of and interactions among a group of variables. Two types of models are usually recognized. They are lumped parameter models and distributed parameter models. Lumped parameter models attempt to evaluate spatially variable parameters by calculating effective values for an entire area. The influences of spatial nonuniformities are condensed into mathematically equivalent point coefficient values. Lumped parameter models reduce the computational requirements and usually try to minimize lost simulation accuracy.

Distributed parameter models incorporate data on the aerial distribution of parameter variations with computational algorithms to evaluate these influences. These types of models increase simulation accuracy and required computational inputs. Modern computers make the distributed models desirable.

Relative advantages of distributed models over lumped models depend on the application. However, when modeling runoff and sediment concentrations it is believed that distributed parameter models offer significant advantages. Distributed models, for example, can evaluate the significance of degrees of lumping. It is not possible to use a lumped model to do this.

Some prominent watershed models available are TVA HYSIM (lumped) (Betson et al. 1980), TENN-1 (lumped) (Overton and Crosby 1979), ANSWERS (distributed) (Beasley et al. 1980), FESHM (distributed) (Wolfe et al. 1979), SEDIMOT II (distributed) (Warner et al. 1982). HYSIM is a continuous simulation lumped parameter model. ANSWERS, FESHM and SEDIMOT II are event distributed parameter simulation models. SEDIMOT II was chosen for modeling work in this study because its input requirements can be readily determined from a topographic map and field data survey.

SEDIMOT II is built in four major areas: (1) rainfall component, (2) runoff component, (3) sediment component, and (4) sediment control component. The rainfall component allows a design event or a measured storm to be used. Design event rainfall depths are taken from the SCS type I or II curves. Input storms require accumulated time and depth values and the maximum 30 minute intensity.

For simulation purposes the watershed is divided into a sequence of junctions, branches, and structures as shown in Figure 2. Above each structure the subbasin is divided into subwatersheds of uniform land use. Runoff component input parameters are found for each subarea. Inputs required are drainage area, curve number, time of concentration, travel time, Muskingams routing coefficients, and unit hydrograph type (disturbed, agricultural, forested). This component has been evaluated using published rainfall-runoff data from eight watersheds with a total of 27 storms. Figure 3 shows the fit of predicted verses observed values. The hydraulic component worked well on the tested watersheds.

Two different subroutines can be used within the sediment compon-

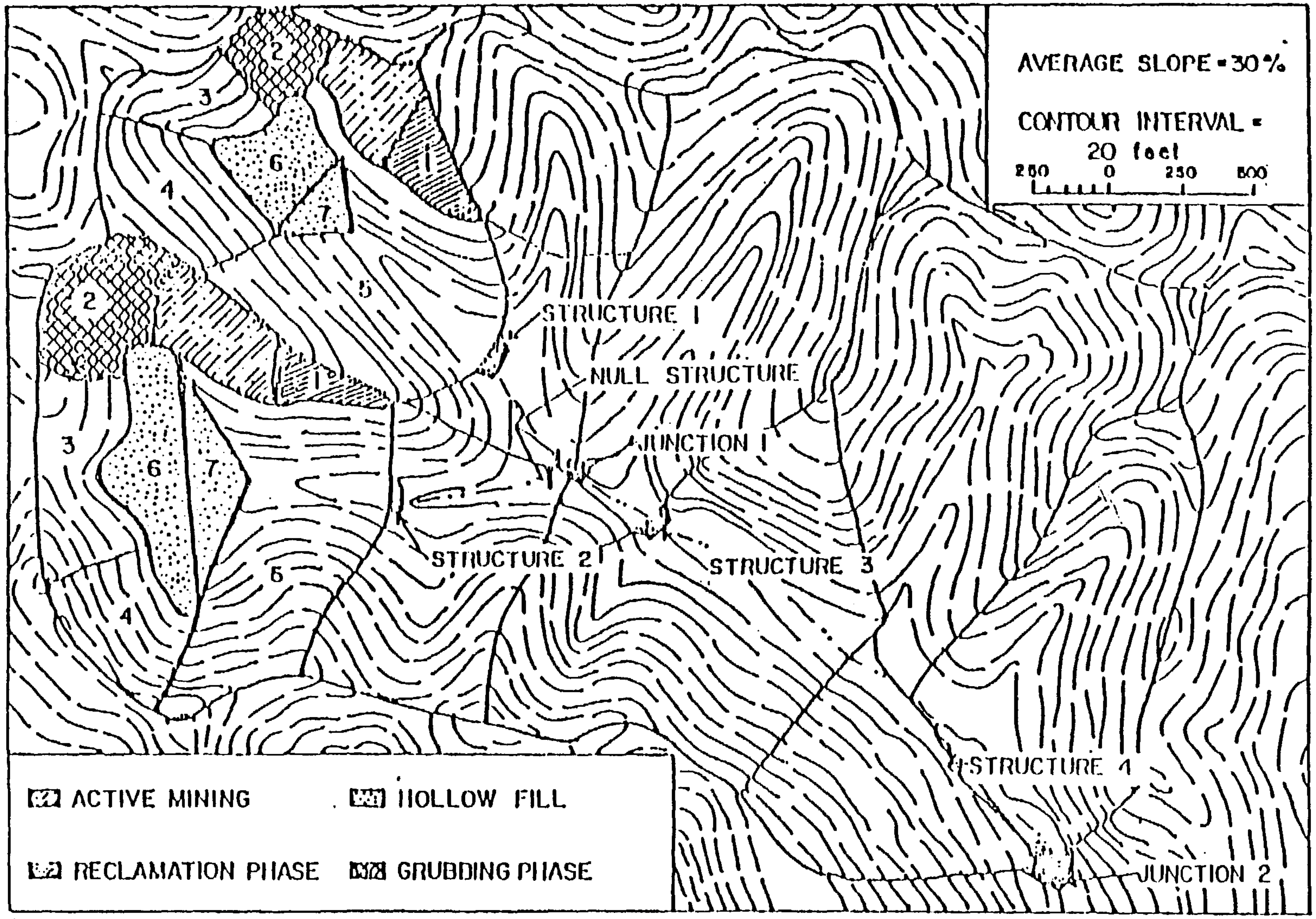


Figure 2. Example Watershed Division for SEDIMOT II Simulation (SEDIMOT Design Manual, 1982)

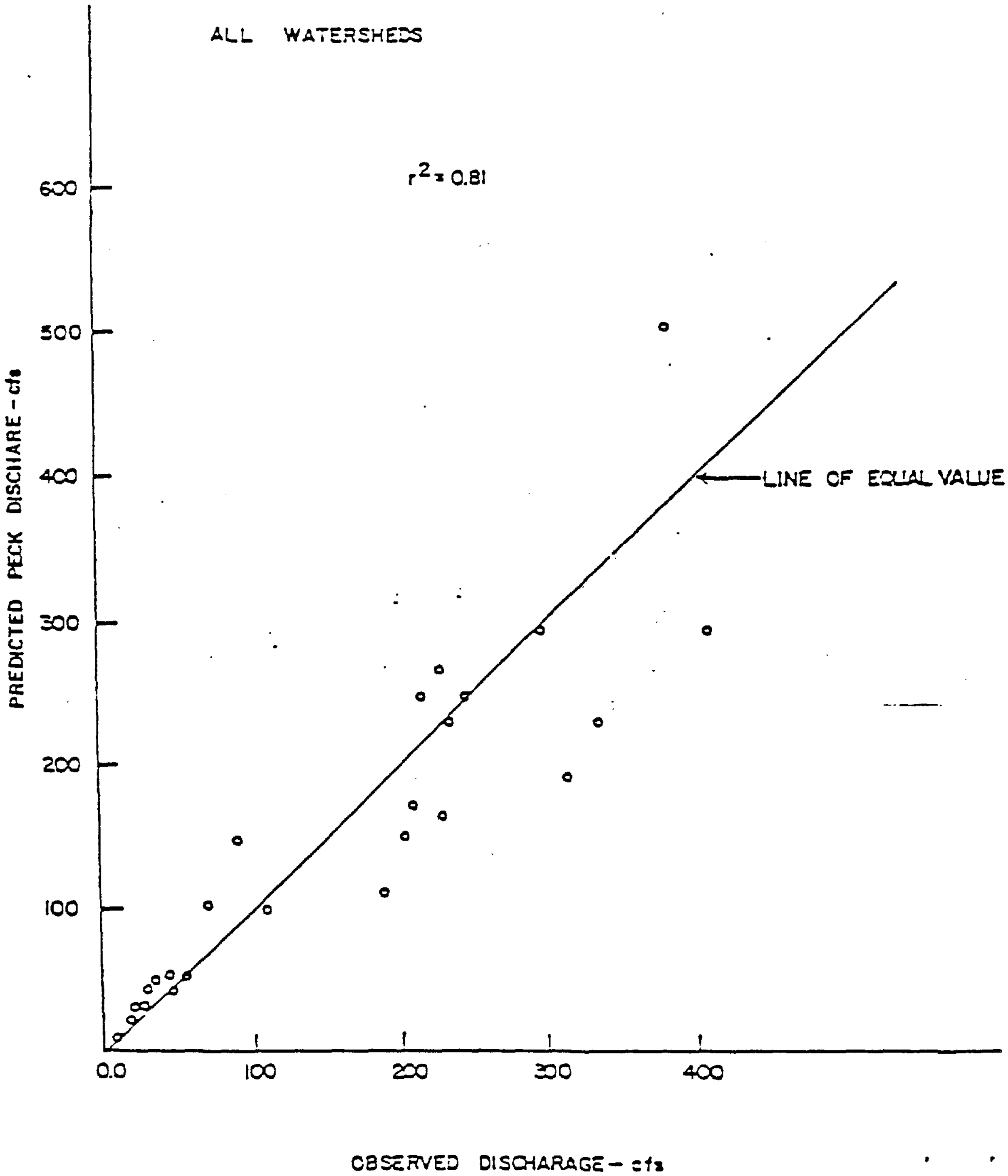


Figure 3. Prediction Accuracy of Hydraulic Component (SEDIMOT Design Manual, 1982)

ent to calculate sediment yield. The MUSLE discussed in the previous section is used in the MUSLE subroutine. This subroutine will be used to calculate sediment yield. Inputs for this component are specific gravity of eroded sediment, bulk specific gravity of settleable mass, load rate coefficient, and eroded particle size-percent finer distribution. Soil erodibility, slope length, slope, and control practice factors were determined for each subwatershed. Determination of these factors was discussed in the previous section.

SEDCAD$^+$ is similar to SEDIMOT II. The main difference is that SEDCAD$^+$ has computer-aided design features.

METHODS

Four datasets were collected for inclusion in the statewide geographic analysis of South Carolina. The information system included watershed boundaries, general soil groups, hydrology (streams and reservoirs), and land use/land cover categories. These datasets were obtained from various sources on different types of media at different mapping scales.

Data Sets

Watershed Boundaries - Watershed boundaries were digitized from a single 1:500,000 scale Hydrologic Unit Map of South Carolina. This map was compiled by the USDA Soil Conservation Service in 1970 (revised in 1981) on a basemap prepared by the U.S. Geological Survey. Each of the 280 watershed units identified on the map were digitized and stored in the computer.

General Soil Groups - General soil groups were digitized from ten 1:250,000 scale sheets showing the draft mapping unit delineations for the updated General Soil Map of South Carolina (SCS 1988). Each of the 160 general soil groups contained information about the predominant soil series found within each general soil group. The information used to characterize each soil series included erodibility, slope gradient, hydrologic soil group, particle size distribution (texture), capability class, flooding frequency-where applicable, and percent of each mapping unit in terms of acreage. These statistics were used to characterize the physical properties of the soil found within each watershed.

Hydrology - Hydrologic data (streams and reservoirs) were digitized from the Hydrologic Unit Map. Stream lengths were determined for each Watershed Unit on a Cataloging Unit basis for subsequent input into the SEDCAD$^+$ modelling procedure.

Land Use/Land Cover - Land use/land cover information was incorporated into the GIS by importing a digital file which contained U.S. Geological Survey-air photo interpreted land use/land cover data, dated 1977. Although the dataset was over 10 years old, it contained the most current available land use/land cover information for the entire state. Table 3 shows the eight categories of land use/land cover identified.

Major Land Resource Areas - Six Major Land Resource Areas (MLRA) have been identified in South Carolina (SCS 1980). The MLRA's contain geographically associated land resource units which have been identified, from northwesterly to southeasterly: Blue Ridge, Southern Piedmont, Carolina and Georgia Sand Hills, Southern Coastal Plain, Atlantic Coast Flatwoods, and Tidewater Area. The final result of the study compares the potential sediment yield of all watersheds by MLRA.

Construction of the Geographical Information System

Once data entry was achieved, either by manual digitizing digital file importation, each dataset was converted to a gridded format. The computer files containing mapped information were divided into 2205 columns by 1759 rows of grid cells, each measuring 200 meters by 200 meters. The layers of data were thus prepared for overlay analysis.

Due to differences in the scales and formats of map sources, the data layers were adjusted to register with one another in their correct planimetric position on the earth's surface.

Data analysis was accomplished by extracting the soil group and land use/land cover data for each of the 280 watersheds and digitally overlaying them to produce acreage and percent-area amounts of land use/land cover within each soil map unit.

Sediment Yield Projections

Output from the GIS was used to develop a land use/soils overlay, and information generated from these combined datasets were used in a LOTUS 123 spreadsheet to calculate lumped parameters, by watershed, for modeling sediment yield. The lumped parameters derived from the GIS data were:

1. area of watershed (acres)
2. curve number
3. time of concentration
4. slope gradient
5. eroded particle size distribution
6. erodibility
7. maximum length to slope break
8. control practice factor

Several factors were held constant irregardless of watershed location. These factors are listed in Table 3.

TABLE 3. Constants used in the statewide sediment yield model for calculating lumped parameters.

Land Use Class	Land Use Description	HSG and SCS Curve Number A	B	C	D	Control Practice CP	Hydrographic Response
1	Urban	70	80	86	89	.03	Fast
2	Agricultural	54	70	79	84	.9	Med.
3	Rangeland	54	70	79	84	.037	Med.
4	Forest	35	65	74	83	.003	Med.
5	Water	100	100	100	100	0	Fast
6	Forested Wetlands	100	100	100	100	.0001	Slow
7	Non Forested Wetlands	100	100	100	100	.0001	Slow
8	Bare	72	82	87	89	1.2	Med.

The constants listed in Table 3 were used in the following equations to calculate lumped parameters, by watershed.

$$\text{CN (Curve Number)} = \frac{\Sigma CN_i A_i}{\Sigma A_i}$$

$$t_c \text{ (Time of Concentration} = L^{.8}[((1000/CN)-10)+1]^{.7}/1140(S)^{.5}$$

L = Maximum Length of Flow

$$\text{S (Slope)} = \frac{\Sigma SiAi}{\Sigma Ai}$$

$$\text{K (Erodibility)} = \frac{\Sigma KiAi}{\Sigma Ai}$$

$$\text{CP (Control Practice)} = \frac{\Sigma CPiAi}{\Sigma Ai}$$

The area weighting technique, using the equations listed above, was utilized throughout the analysis. For example, to develop general soil information for individual mapping unit, each soil series within the mapping unit was proportionately weighted by acreage and averaged to obtain statistics for the entire mapping unit. Next, the watershed boundary were overlain onto the soil mapping unit, and land use was combined with the watershed/soil dataset. Each watershed's combined data were extracted from the new composite statewide database for input into the mathematical model. The equation listed above were used to develop lumped parameters, by watershed, for use in the SEDCAD$^+$ sediment yield model. In addition, the eroded particle size distributions were determined from the revised Creams equations.

The SEDCAD$^+$ simulation procedure was followed using the lumped parameters generated for each watershed. In many cases, the time of concentration was modified to a maximum acceptable value if the calculated value exceeded the maximum. In the SEDCAD$^+$ program, six hours is the maximum value for complete unit hydrograph evaluation. Since the time of concentration exceeded six hours for most watersheds, the outflow hydrograph does not simulate observed conditions. Therefore, a comparative analysis by watershed is the appropriate means for evaluating derived sediment yields among watersheds within the same MLRA. The output values used for comparative purposes were sediment yield in terms of tons per square mile and, for reference, concentration of sediment in terms of milligrams per liter.

To generate these final statistics, a predetermined storm event was held constant for each watershed. A 2-year 24-hour storm was selected as the designed storm event. This event was selected because it has been reported in the literature that natural stream channels are stable and would not significantly contribute to sediment yield during a storm event of this magnitude (Wolman et. al, 1960; Baker, 1977). For South Carolina, precipitation for 2-year 24-hour storm ranges from five inches in the upper part of the state and along the coast, to three and one-half inches in the northeastern part of the state.

Abandoned Mine Lands

In 1978 and 1979, the SCLRCC, within its Division of Mining and Reclamation, conducted a statewide inventory of abandoned mine lands. The inventory served to compile information on abandoned mine lands by county, including the number of mines, the location of each mine, descriptions of the physical characteristics of each site, and estimates of the severity of problems emanating from such lands.

Other qualitative characteristics noted for each site included the commodity mined, surrounding land use, public safety hazard, nature of the terrain, condition of perimeter slopes, amount of groundcover, reclamation requirements, and water area. Waterbodies comprised 21% of the total area of abandoned mine lands; however, no quantitative descriptions of water quality were included.

RESULTS AND DISCUSSION

Geographical Database

Graphic output was produced to check various elements of the analysis and to describe the GIS construction and overlay process. Figure 4 shows the streams, reservoirs, and the 280 watersheds. Figure 5 shows the 160 general soil groups for South Carolina. Figure 6 shows the eight land use/land cover categories for the state. Figure 7 shows a sample watershed (#20) with hydrologic features.

FIGURE 4.

RESERVOIRS AND STREAMS BY WATERSHED

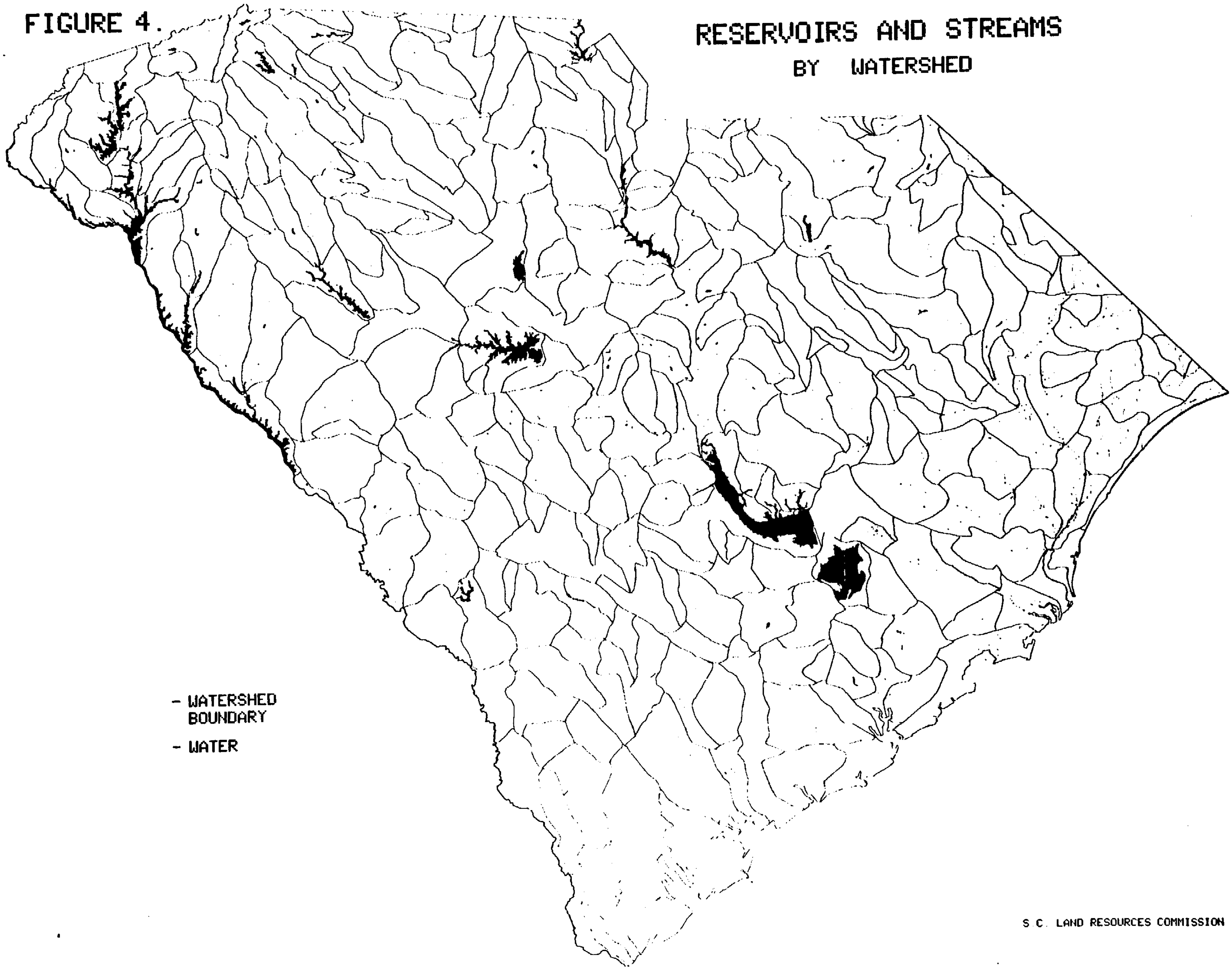


FIGURE 5.

GENERAL SOIL ASSOCIATIONS

BY WATERSHED

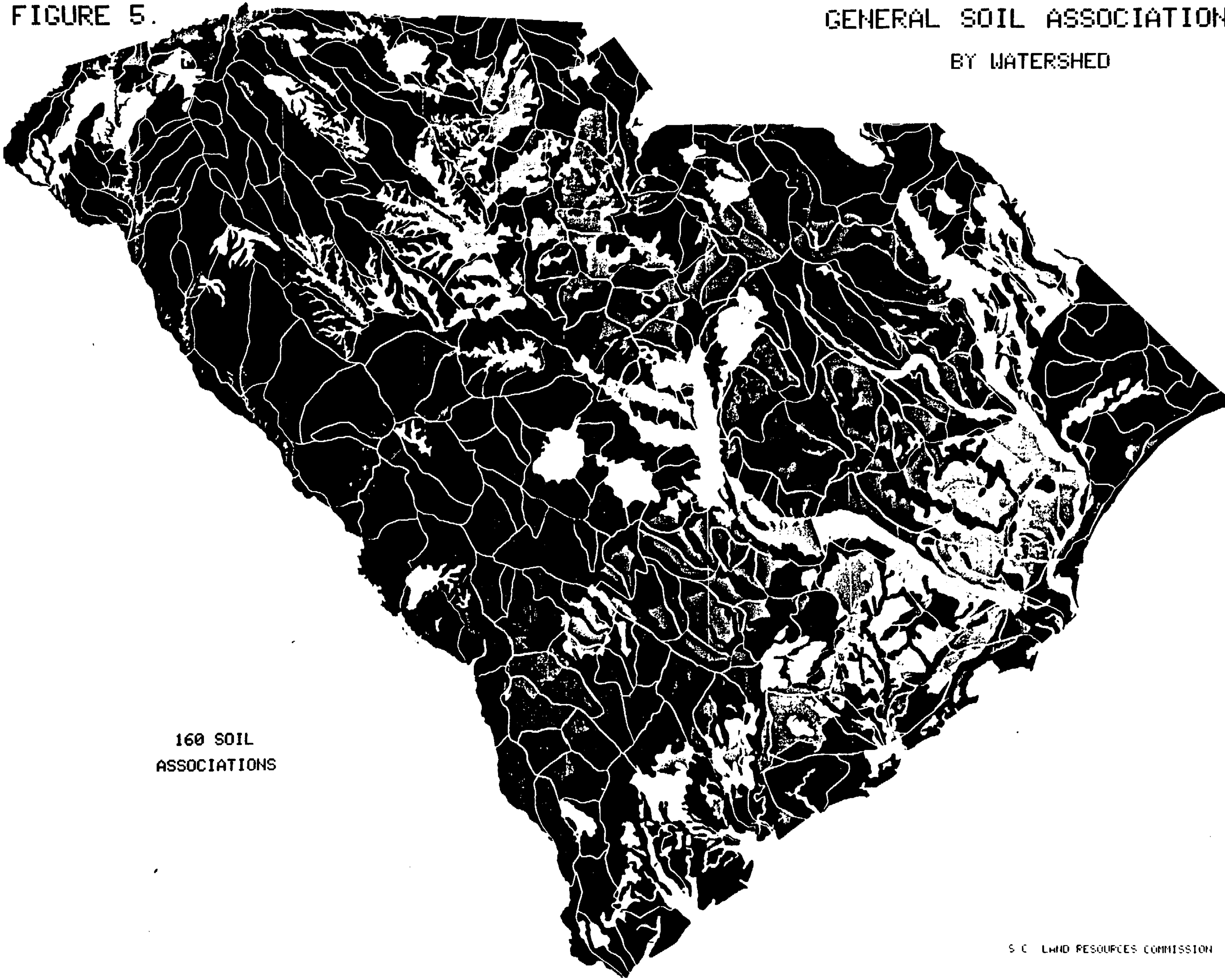


FIGURE 6.

LAND USE/LAND COVER BY WATERSHED

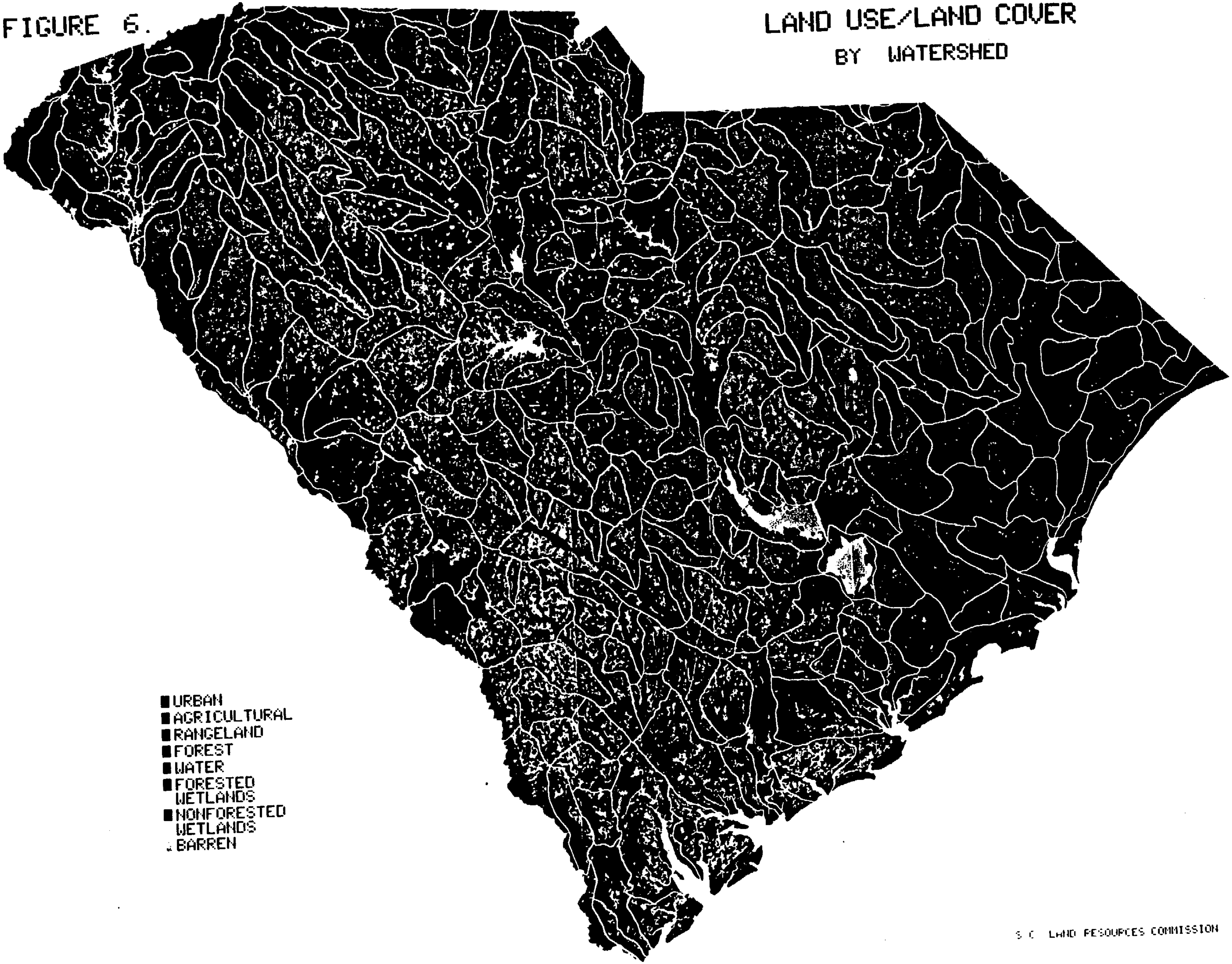
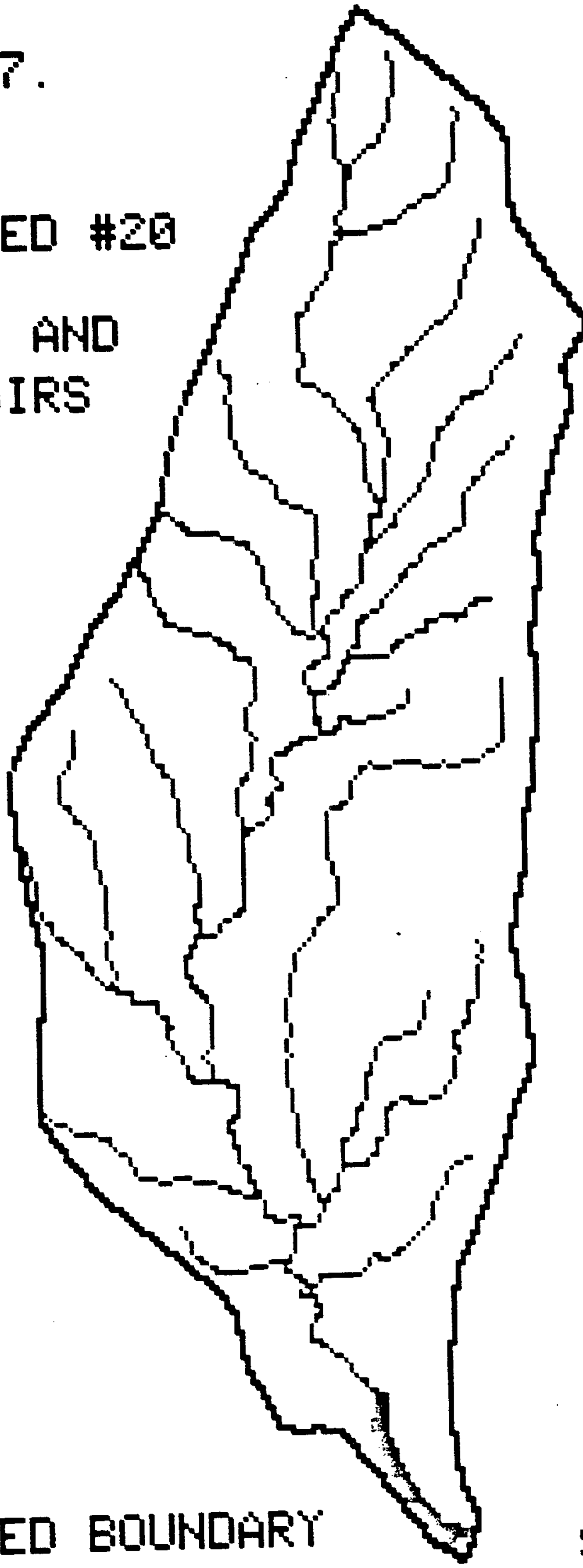


FIGURE 7.

S.C.
WATERSHED #20

STREAMS AND
RESERVOIRS



- WATER
- WATERSHED BOUNDARY

SCLRCC

FIGURE 8.

S.C.
WATERSHED
#20

GENERAL
SOIL
MAP

SOIL ASS'N	MAP UNIT #
CECIL HIWASSEE WILKES	SC001
CECIL HIWASSEE	SC002
IREDELL ARMENIA	SC003
CECIL CATAULA APPLING	SC004
CECIL HIWASSEE MECKLENBURG	SC005
MADISON DAVIDSON PACOLET	SC006
CATAULA CECIL WILKES	SC009
WILKES ENON	SC010
CATAULA ENON HIWASSEE	SC011

WATER

SCLRCC

FIGURE 9.

S.C.
WATERSHED #20

LAND USE/LAND COVER

■ URBAN
■ AGRICULTURAL
■ FOREST
□ WATER
■ FORESTED WETLANDS
▤ BARREN

SCLRCC

Figures 8 and 9 show the soil map units and land use/land cover types for Watershed 20, respectively.

The information shown in Figures 7 through 9 were generated for all 280 watersheds identified in the study. Statistical output from the combination of these datasets was manipulated in a LOTUS 123 database management system and passed to the SEDCAD$^+$ program.

Sediment Yield Predictions

A weighted average of yield in tons per square mile was determined for each watershed by the SEDCAD$^+$ program. All 280 watersheds were grouped by MLRA so that the calculated sediment yields could be compared within similar physiographic regions of the state. The calculated sediment yield value was compared to one weighted average, two times the weighted average, and three times the weighted average for each watershed within the six MLRA's. Watersheds that had values equal to or greater than these weighted averages were identified, and are shown in Table 4.

A total of 134 watersheds were identified, with 117 greater than or equal to one weighted average, 15 greater than or equal to two times the weighted average, and 2 greater than or equal to three times the weighted average. Taking into account the limitations of this analysis, the 134 watersheds identified are assumed to be "potentially" nonpoint source polluted by sediment.

Abandoned Mine Lands

The survey identified a total of 14,218 acres of abandoned mine lands, 6,033 acres of which had not been reclaimed. Of the total acres of abandoned mine land, 3,948.8 acres were identified as having moderate to severe off-site sedimentation and/or surface conditions

TABLE 4

Weighted Average Comparison by Watersheds

WSH #	MLRA	CAT #	UNIT#	AREA (SQ MI)	TONS/ SQ MI	>WA	>2WA	>3WA
32	153A	3060106	140	108.93	337			
33	153A	3060109	20	148.61	385			
34	153A	3060109	50	124.70	320			
36	153A	3050208	50	138.82	463	36		
37	153A	3050208	60	80.34	818	37		
38	153A	3050208	80	113.61	472	38		
39	153A	3050208	120	90.26	509	39		
47	153A	3050208	20	160.98	410			
48	153A	3050208	30	152.02	357			
49	153A	3050208	70	103.74	416			
53	153A	3050207	50	152.01	809	53		
54	153A	3050207	40	167.05	607	54		
57	153A	3050207	100	54.16	475	57		
58	153A	3050207	80	67.45	552	58		
59	153A	3050207	90	80.33	340			
60	153A	3050207	110	73.95	549	60		
75	153A	3050203	80	91.93	580	75		
76	153A	3050205	10	143.76	287			
77	153A	3050205	20	57.25	502	77		
78	153A	3050205	30	68.20	181			
79	153A	3050205	40	159.90	395			
80	153A	3050205	50	22.16	74			
84	153A	3050206	20	107.91	573	84		
85	153A	3050206	30	79.43	450	85		
86	153A	3050206	40	102.49	411			
87	153A	3050206	50	31.68	542	87		
88	153A	3050206	55	21.51	476	88		
89	153A	3050206	60	110.97	355			
90	153A	3050206	70	142.93	385			
91	153A	3050202	10	140.68	255			
92	153A	3050202	20	96.81	502	92		
93	153A	3050202	30	36.45	180			
98	153A	3050201	10	61.41	328			
99	153A	3050201	20	113.35	237			
100	153A	3050201	30	67.73	205			
103	153A	3050201	60	79.09	155			
195	153A	3050112	10	177.94	391			
196	153A	3050112	20	54.29	580	196		
212	153A	3040202	97	16.31	551	212		
213	153A	3040202	100	173.84	688	213		
214	153A	3040202	110	62.30	451	214		
215	153A	3040202	140	24.93	460	215		
216	153A	3040202	150	56.13	489	216		
217	153A	3040202	120	162.32	447			
218	153A	3040202	160	53.95	397			
219	153A	3040202	170	51.17	372			
220	153A	3040202	130	63.40	382			
224	153A	3040205	20	14.95	416			
229	153A	3040205	70	130.10	420			
230	153A	3040205	110	188.63	460	230		
231	153A	3040205	100	38.61	330			
232	153A	3040205	120	63.25	402			
233	153A	3040205	130	78.30	425			

(WA = 1 weighted average in tons/sq.mi.)
(2WA = 2 weighted average in tons/sq.mi.)
(2WA = 3 weighted average in tons/sq.mi.)

TABLE 4

WSH #	MLRA	CAT #	UNIT#	AREA (SQ MI)	TONS/ SQ MI	>WA	>2WA	>3WA
234	153A	3040205	140	232.53	481	234		
235	153A	3040205	160	132.11	487	235		
236	153A	3040205	150	182.94	273			
237	153A	3040205	170	130.89	328			
256	153A	3040201	150	168.53	637	256		
257	153A	3040201	140	98.83	361			
258	153A	3040201	160	160.92	458	258		
261	153A	3040204	50	167.14	827	261		
262	153A	3040204	38	8.19	727	262		
266	153A	3040204	70	323.19	438			
267	153A	3040204	90	78.47	463	267		
268	153A	3040204	80	163.25	495	268		
269	153A	3040204	88	45.38	431			
271	153A	3040203	220	79.39	426			
272	153A	3040206	66	13.55	329			
273	153A	3040206	100	36.11	375			
274	153A	3040206	110	51.14	481	274		
275	153A	3040206	120	132.14	536	275		
276	153A	3040206	91	55.40	316			
35	153B	3060109	60	56.37	97			
40	153B	3050208	130	145.92	213	40		
41	153B	3050208	140	44.02	108			
42	153B	3050208	110	91.80	125			
43	153B	3050208	90	339.73	397	43		
44	153B	3050208	100	196.16	277	44		
45	153B	3050208	10	323.44	306	45		
46	153B	3050208	40	81.04	153			
81	153B	3050205	60	222.88	191			
82	153B	3050205	70	149.95	391	82		
94	153B	3050202	40	65.15	135			
95	153B	3050202	50	224.89	267	95		
96	153B	3050202	60	135.93	72			
97	153B	3050202	70	82.34	356	97		
101	153B	3050201	40	163.45	50			
102	153B	3050201	50	69.07	119			
104	153B	3050201	70	59.94	79			
105	153B	3050201	80	94.48	164			
197	153B	3050112	30	260.74	167			
198	153B	3050112	40	71.76	269	198		
199	153B	3050112	50	81.86	51			
200	153B	3050112	60	94.97	194			
238	153B	3040205	180	133.64	135			
239	153B	3040207	40	165.89	139			
240	153B	3040207	50	71.28	47			
241	153B	3040207	30	44.99	193			
259	153B	3040201	170	117.10	155			
277	153B	3040206	130	110.49	123			
278	153B	3040206	140	160.36	167			
279	153B	3040206	150	58.33	49			
1	130	3060102	30	24.88	12,909		1	
2	130	3060102	60	91.91	8,999	2		

TABLE 4

WSH #	MLRA	CAT #	UNIT#	AREA (SQ MI)	TONS/ SQ MI	>WA	>2WA	>3WA
3	130	3060102	120	111.09	3,311			
6	130	3060101	20	48.82	532			
10	130	3060101	30	106.06	5,640	10		
106	130	3050109	10	71.74	8,104	106		
107	130	3050109	20	134.43	6,030	107		
108	130	3050109	30	45.52	653			
50	133	3050207	10	80.84	856	50		
51	133	3050207	20	25.90	1,299	51		
55	133	3050207	60	114.28	1,111	55		
63	133	3050204	30	122.37	836	63		
65	133	3050204	60	40.87	1,115	65		
66	133	3050204	70	36.94	879	66		
67	133	3050204	50	267.70	1,156	67		
73	133	3050203	60	89.12	663			
74	133	3050203	70	79.37	481			
83	133	3050206	10	84.53	764	83		
186	133	3050110	50	101.56	494			
187	133	3050110	60	57.05	568			
188	133	3050110	70	73.62	549			
189	133	3050111	10	191.51	530			
190	133	3050111	20	93.41	726	190		
191	133	3050111	29	14.93	757	191		
192	133	3050111	30	45.42	723	192		
193	133	3050111	40	30.98	557			
194	133	3050111	50	47.15	389			
211	133	3040202	90	179.90	697	211		
223	133	3040205	10	93.76	807	223		
225	133	3040205	60	93.15	908	225		
226	133	3040205	50	45.13	646			
227	133	3040205	80	154.17	447			
228	133	3040205	90	272.80	511			
245	133	3040201	33-	25.62	958	245		
246	133	3040201	29	6.72	811	246		
247	133	3040201	19-	9.13	558			
248	133	3040201	41-	28.11	354			
249	133	3040201	50	362.28	533			
250	133	3040201	72	68.68	830	250		
251	133	3040201	97	10.58	557			
252	133	3040201	90	114.20	761	252		
254	133	3040201	130	227.24	490			
255	133	3040201	120	141.58	441			
260	133	3040204	15	39.95	678			
263	133	3040204	30	138.97	746	263		
264	133	3040204	49	2.49	599			
265	133	3040204	60	20.26	863	265		
270	133	3040203	215	53.82	655			
280	133	3040204	29	0.48	782	280		
4	136	3060102	130	60.88	7,411		4	
5	136	3060102	150	49.30	8,755		5	
7	136	3060101	50	147.22	4,825	7		
8	136	3060101	80	96.31	7,405		8	

TABLE 4

WSH #	MLRA	CAT #	UNIT#	AREA (SQ MI)	TONS/ SQ MI	>WA	>2WA	>3WA
9	136	3060101	40	173.94	7,312	9		
11	136	3060101	70	48.30	2,135			
12	136	3060101	60	117.70	7,392		12	
13	136	3060101	90	68.13	4,493	13		
14	136	3060101	100	78.33	6,088	14		
15	136	3060103	20	13.58	11,773			15
16	136	3060103	30	193.44	4,403	16		
17	136	3060103	80	43.34	4,162	17		
18	136	3060103	70	201.30	4,888	18		
19	136	3060103	100	112.96	692			
20	136	3060103	140	334.41	3,282			
21	136	3060103	150	238.60	1,583			
22	136	3060107	10	253.37	1,132			
23	136	3060107	20	234.63	1,569			
24	136	3060107	30	42.89	975			
25	136	3060107	40	225.12	498			
26	136	3060106	30	41.96	408			
109	136	3050109	40	131.91	5,140	109		
110	136	3050109	50	33.35	6,573	110		
111	136	3050109	60	40.08	5,213	111		
112	136	3050109	70	17.58	4,383	112		
113	136	3050109	80	254.14	3,971	113		
114	136	3050109	90	44.13	5,286	114		
115	136	3050109	100	115.14	2,616			
116	136	3050109	110	38.43	7,514		116	
117	136	3050109	120	88.51	6,148	117		
118	136	3050109	130	139.85	5,355	118		
119	136	3050109	140	156.78	1,966			
120	136	3050109	150	260.75	3,718	120		
121	136	3050109	160	125.16	3.844	121		
122	136	3050109	163	113.61	3,484			
123	136	3050109	170	232.49	4,320	123		
124	136	3050109	180	106.37	1,848			
125	136	3050109	190	167.39	2,715			
126	136	3050109	200	21.25	951			
127	136	3050109	210	95.60	939			
128	136	3050108	10	266.71	5,683	128		
129	136	3050108	20	113.09	2,149			
130	136	3050108	30	54.89	5,977	130		
131	136	3050108	40	106.92	3,583			
132	136	3050108	43	38.44	1,477			
133	136	3050108	50	187.45	2,091			
134	136	3050107	10	179.10	4,161	134		
135	136	3050107	20	40.87	3,986	135		
136	136	3050107	30	41.45	2,596			
137	136	3050107	40	102.35	5,745	137		
138	136	3050107	50	239.64	3,806	138		
139	136	3050107	60	243.99	3,991	139		
140	136	3050105	155	47.83	7,554		140	
141	136	3050105	160	88.07	7,545		141	
142	136	3050105	180	93.63	5,514	142		
143	136	3050105	170	132.21	8,715		143	
144	136	3050105	58	9.50	11,002			144

TABLE 4

WSH #	MLRA	CAT #	UNIT#	AREA (SQ MI)	TONS/ SQ MI	>WA	>2WA	>3WA
145	136	3050105	94	143.08	5,946	145		
146	136	3050105	110	23.09	5,752	146		
147	136	3050105	130	154.77	7,643		147	
148	136	3050105	109	23.77	4,147	148		
149	136	3050105	122	41.70	1,338			
150	136	3050105	142	120.76	7,933		150	
151	136	3050105	190	126.18	4,961	151		
152	136	3050101	190	64.80	3,694	152		
153	136	3050101	200	61.62	4,434	153		
154	136	3050106	10	122.60	3,483			
155	136	3050106	20	152.45	5,733	155		
156	136	3050106	30	54.95	2,726			
157	136	3050106	40	160.79	2,547			
158	136	3050106	50	224.29	2,621			
159	136	3050106	60	247.61	1,022			
160	136	3050106	70	188.16	1,298			
161	136	3050106	80	61.38	1,892			
162	136	3050106	90	96.47	872			
163	136	3050103	10	148.70	1,151			
164	136	3050103	28	43.83	1,788			
165	136	3050103	38	35.35	2,164			
166	136	3050103	50	42.84	2,658			
167	136	3050103	60	219.68	3,834	167		
168	136	3050103	70	24.50	3,276			
169	136	3050103	90	217.49	4,021	169		
170	136	3050103	42	201.23	3,124			
171	136	3050103	80	35.06	999			
172	136	3050104	10	262.11	2,289			
173	136	3050104	20	60.56	3,823	173		
175	136	3050104	40	70.49	1,180			
176	136	3050104	50	61.38	1,159			
201	136	3040105	80	2.81	10,653		201	
202	136	3040104	60	7.04	5,593	202		
203	136	3040202	15	27.77	4,507	203		
204	136	3040202	20	15.60	4,644	204		
205	136	3040202	50	47.77	1,416			
206	136	3040202	30	59.55	2,281			
207	136	3040202	40	47.51	689			
208	136	3040202	70	124.76	848			
27	137	3060106	50	158.37	205			
28	137	3060106	60	187.25	830	28		
29	137	3060106	100	220.89	494			
30	137	3060106	110	135.19	99			
31	137	3060106	130	169.10	309			
52	137	3050207	30	18.17	996	52		
56	137	3050207	70	60.59	705			
61	137	3050204	20	150.06	1,013	61		
62	137	3050204	10	221.82	943	62		
64	137	3050204	40	63.12	1,243	64		
68	137	3050203	10	84.96	552			
69	137	3050203	30	64.65	384			
70	137	3050203	20	98.81	343			

TABLE 4

WSH #	MLRA	CAT #	UNIT#	AREA (SQ MI)	TONS/ SQ MI	>WA	>2WA	>3WA
71	137	3050203	40	191.16	1,093	71		
72	137	3050203	50	86.15	1,206	72		
174	137	3050104	30	362.62	546			
177	137	3050104	60	124.42	623			
178	137	3050104	70	67.72	288			
179	137	3050104	80	67.69	1,650		179	
180	137	3050104	90	79.38	128			
181	137	3050104	100	74.72	194			
182	137	3050110	10	218.15	229			
183	137	3050110	20	157.32	296			
184	137	3050110	30	72.54	379			
185	137	3050110	40	52.08	339			
209	137	3040202	60	193.10	808	209		
210	137	3040202	80	80.17	261			
221	137	3040205	30	112.42	1,502		221	
222	137	3040205	40	20.54	871	222		
242	137	3040201	62	288.89	1,944		242	
243	137	3040201	100	172.86	1,040	243		
244	137	3040201	80	76.98	742	244		
253	137	3040201	110	322.98	757	253		

that would require major efforts for reclamation. The identification of sites having major reclamation needs was based on several factors that indicate the potential for surface or groundwater impact, including severe erosion, sloughing highwalls, lack of vegetation, or potentially poor water quality. Acreages of these sites are identified on a watershed basis in Table 5.

The abandoned mine lands inventory is a useful tool for site identification and for determining the reclamation needs of these areas. The study, however, is now ten years old and the condition of many of these sites may have improved or deteriorated through time. Additional site-specific information is required to accomplish a more accurate assessment of nonpoint pollution. Furthermore, information on soils, slope steepness, and slope length is not presently available for mined areas. Therefore, general information obtained from existing datasets can not be used to predict soil loss from these sites. Hydrologic data should be collected for these areas, including water quality inventory for surface waters within and adjacent to the mine site. Potential sources of acid or toxic forming materials should also be identified.

TABLE 5. Watersheds containing abandoned mine lands that may contribute to nonpoint source pollution.

ABANDONED MINE LAND

Watershed No.	Acreage with Moderate or Severe Off-site Sedimentation	Other Acreage with Major Reclamation Needs
4		7.2
8		25.0
10		10.4
11		42.0
12		6.5
16		1.3
19		2.0
22	0.5	
23		1.3
24		10.0
26	11.0	1.3
27	32.5	264.0
28	7.2	15.3
29	1.3	
30		0.3
31	6.0	2.3
36	3.7	
37		16.5
38	1.8	
39	3.6	
42	13.5	
43	2.5	
47		105.0
49	10.0	
50	1.1	
51	8.3	
52	1.6	
53	1.7	
55	0.4	
56	14.5	
60	2.0	
61	10.9	
62	2.5	112.3
64	0.9	
67		8.0
68	20.5	9.0
69	2.5	
70	11.1	
72	12.3	3.8
74		6.0
79		30.0
81	8.1	4.0
84		20.0
86		181.0

Table 5 (con't.)

Watershed No.	Acreage with Moderate or Severe Off-site Sedimentation	Other Acreage with Major Reclamation Needs
87		70.0
90		20.5
91		2.0
92		757.0
93		75.0
94		3.6
95	18.0	
97	17.0	
106	3.8	
107	3.0	
109	9.0	
115	5.0	
118	1.0	
119		11.5
120		1.3
122	3.0	
123	12.2	
127		5.0
128	7.8	
129	67.5	8.5
131		6.0
133		7.0
134	11.3	
135	1.4	
136	0.6	
137	2.3	
138	2.8	5.2
139	21.5	
140	3.6	
142	5.2	
143	6.4	
147	0.3	2.0
148	5.0	
149	42.2	6.1
150	8.6	
151	2.0	
152		45.0
154	0.5	0.2
157	10.2	
158	7.2	7.7
159	71.0	
160	3.2	7.5
161	2.5	
162	1.4	
163	2.0	
164		3.5
165	4.3	3.6

Table 5. (con't.)

Watershed No.	Acreage with Moderate or Severe Off-site Sedimentation	Other Acreage with Major Reclamation Needs
169	3.2	
170	4.6	
171		2.5
172	4.3	8.3
174	3.5	80.5
176	4.3	
177	20.0	
178	1.4	10.6
179		237.5
180	5.7	7.2
181	6.6	
182		1.4
183	18.1	81.5
188		8.0
189		45.1
198	2.0	
199	4.0	
204		2.0
206	2.8	0.8
208	8.5	
209	2.8	
210	0.5	3.0
211	1.5	3.5
221	3.9	0.7
223		2.0
227		9.5
228	18.0	
230		53.4
232	11.0	19.5
241	17.2	
242	10.9	2.0
243	0.9	56.1
244	2.1	4.8
245		0.2
248	75.0	2.2
249	18.6	144.4
250	75.0	113.0
252		19.5
253	20.1	1.6
254	12.0	13.5
255		4.0
257		4.0
259		8.0
263	7.5	3.0
271		138.0
277		4.0
TOTAL	920.8	3028.0

A P P E N D I X A

SEDIMENT YIELD BY WEIGHTED AVERAGE

WSH #	MLRA	AVG SLOPE	CAT #	UNIT#	TONS	MG/L	AREA (ACRES)	AREA (SQ MI)	TONS/SQ MI	>WA	>2WA	>3WA
32	153A	1.9	3060106	140	36,729	2.611	69.716	108.93	337			
33	153A	1.3	3060109	20	57,207	2,460	95,109	148.61	385			
34	153A	1.2	3060109	50	39,858	1,880	79,808	124.70	320			
36	153A	1.4	3050208	50	64,207	3,209	88,842	138.82	463	36		
37	153A	1.4	3050208	60	65,746	4,830	51,419	80.34	818	37		
38	153A	1.3	3050208	80	53,658	2,790	72,711	113.61	472	38		
39	153A	1.2	3050208	120	45,943	2,576	57,765	90.26	509	39		
47	153A	1.3	3050208	20	65,949	2,420	103,027	160.98	410			
48	153A	1.1	3050208	30	54,327	1,888	97,294	152.02	357			
49	153A	1.2	3050208	70	43,154	2,513	66,394	103.74	416			
53	153A	1.4	3050207	50	122,934	5,211	97,284	152.01	809	53		
54	153A	1.5	3050207	40	101,337	3,504	106,911	167.05	607	54		
57	153A	1.3	3050207	100	25,708	2,994	34,665	54.16	475	57		
58	153A	1.5	3050207	80	37,256	3,262	43,166	67.45	552	58		
59	153A	1.2	3050207	90	27,335	2,195	51,410	80.33	340			
60	153A	1.3	3050207	110	40,602	2,969	47,327	73.95	549	60		
75	153A	2.0	3050203	80	53,291	3,935	58,833	91.93	580	75		
76	153A	1.4	3050205	10	41,193	1,823	92,005	143.76	287			
77	153A	1.4	3050205	20	28,746	3,054	36,642	57.25	502	77		
78	153A	1.2	3050205	30	12,312	1,201	43,650	68.20	181			
79	153A	1.5	3050205	40	63,226	3,034	102,334	159.90	395			
80	153A	1.1	3050205	50	1,632	479	14,184	22.16	74			
84	153A	1.5	3050206	20	61,867	4,230	69,063	107.91	573	84		
85	153A	1.4	3050206	30	35,766	3,389	50,836	79.43	450	85		
86	153A	1.4	3050206	40	42,119	2,791	65,594	102.49	411			
87	153A	1.4	3050206	50	17,158	4,330	20,273	31.68	542	87		
88	153A	1.5	3050206	55	10,236	4,340	13,769	21.51	476	88		
89	153A	1.3	3050206	60	39,445	2,519	71,020	110.97	355			
90	153A	1.2	3050206	70	55,065	2,080	91,472	142.93	385			
91	153A	1.1	3050202	10	35,923	1,349	90,038	140.68	255			
92	153A	1.4	3050202	20	48,581	2,893	61,956	96.81	502	92		
93	153A	1.4	3050202	30	6,565	994	23,327	36.45	180			
98	153A	1.2	3050201	10	20,157	1,626	39,300	61.41	328			
99	153A	1.1	3050201	20	26,914	1,103	72,543	113.35	237			
100	153A	1.1	3050201	30	13,916	1,018	43,344	67.73	205			
103	153A	1.1	3050201	60	12,262	736	50,619	79.09	155			
195	153A	1.4	3050112	10	69,567	2,379	113,880	177.94	391			
196	153A	1.4	3050112	20	31,486	3,448	34,744	54.29	580	196		
212	153A	1.6	3040202	97	8,987	4,832	10,438	16.31	551	212		
213	153A	1.6	3040202	100	119,551	5,769	111,260	173.84	688	213		
214	153A	1.4	3040202	110	28,098	3,786	39,874	62.30	451	214		
215	153A	1.4	3040202	140	11,465	3,344	15,954	24.93	460	215		
216	153A	1.4	3040202	150	27,446	3,483	35,920	56.13	489	216		
217	153A	1.3	3040202	120	72,481	3,313	103,886	162.32	447			
218	153A	1.3	3040202	160	21,435	2,830	34,527	53.95	397			
219	153A	1.1	3040202	170	19,036	2,761	32,748	51.17	372			
220	153A	1.6	3040202	130	24,246	2,934	40,576	63.40	382			
224	153A	1.6	3040205	20	6,218	3,342	9,568	14.95	416			
229	153A	1.5	3040205	70	54,670	3,118	83,267	130.10	420			
230	153A	1.5	3040205	110	86,700	3,479	120,720	188.63	460	230		
231	153A	1.4	3040205	100	12,741	2,241	24,711	38.61	330			
232	153A	1.3	3040205	120	25,433	2,731	40,477	63.25	402			
233	153A	1.4	3040205	130	33,300	3,075	50,115	78.30	425			
234	153A	1.4	3040205	140	111,862	3,478	148,822	232.53	481	234		

WSH #	MLRA	AVG SLOPE	CAT #	UNIT#	TONS	MG/L	AREA (ACRES)	AREA (SQ MI)	TONS/SQ MI	>WA	>2WA	>3WA
235	153A	1.3	3040205	160	64,394	3,309	84,552	132.11	487	235		
236	153A	1.2	3040205	150	49,977	1,738	117,082	182.94	273			
237	153A	1.2	3040205	170	42,888	1,936	83,771	130.89	328			
256	153A	1.7	3040201	150	107,306	4,601	107,860	168.53	637	256		
257	153A	1.7	3040201	140	35,662	2,399	63,251	98.83	361			
258	153A	1.3	3040201	160	73,671	2,531	102,987	160.92	458	258		
261	153A	1.5	3040204	50	138,196	5,883	106,970	167.14	827	261		
262	153A	1.3	3040204	38	5,953	5,066	5,239	8.19	727	262		
266	153A	1.3	3040204	70	141,663	2,727	206.844	323.19	438			
267	153A	1.3	3040204	90	36.323	3,211	50,223	78.47	463	267		
268	153A	1.2	3040204	80	80,838	3,435	104,479	163.25	495	268		
269	153A	1.1	3040204	88	19,535	2.678	29.041	45.38	431			
271	153A	1.3	3040203	220	33,824	2,534	50,807	79.39	426			
272	153A	1.2	3040206	66	4.453	2,330	8,669	13.55	329			
273	153A	1.1	3040206	100	13,533	2,119	23,110	36.11	375			
274	153A	1.2	3040206	110	24,611	3,037	32,728	51.14	481	274		
275	153A	1.2	3040206	120	70.894	3,240	84,572	132.14	536	275		
276	153A	1.1	3040206	91	17,527	1,789	35,456	55.40	316			
							MLRA 153A	TOTAL TONS	3234294 TOTAL SQ MI 7,223 TONS /SQ MI 448 # OF WATERSHEDS	33	0	0
35	153B	1.0	3060109	60	5.483	589	36,079	56.37	97			
40	153B	1.1	3050208	130	31,123	1,080	93.389	145.92	213	40		
41	153B	1.1	3050208	140	4,751	535	28.170	44.02	108			
42	153B	1.8	3050208	110	11,510	608	58,754	91.80	125			
43	153B	1.2	3050208	90	134,745	2.098	217.430	339.73	397	43		
44	153B	1.6	3050208	100	54.306	1.342	125.543	196.16	277	44		
45	153B	1.2	3050208	10	99,031	1.602	207,002	323.44	306	45		
46	153B	1.0	3050208	40	12,399	681	51,864	81.04	153			
81	153B	1.2	3050205	60	42,668	1,089	142,644	222.88	191			
82	153B	1.2	3050205	70	58,679	2,275	95,969	149.95	391	82		
94	153B	1.6	3050202	40	8.812	670	41,693	65.15	135			
95	153B	1.4	3050202	50	60,043	1,215	143,929	224.89	267	95		
96	153B	1.1	3050202	60	9,800	302	86,994	135.93	72			
97	153B	1.3	3050202	70	29,334	1,555	52,695	82.34	356	97		
101	153B	1.2	3050201	40	8.153	258	104,608	163.45	50			
102	153B	1.3	3050201	50	8,187	575	44,204	69.07	119			
104	153B	1.3	3050201	70	4,734	383	38,362	59.94	79			
105	153B	1.3	3050201	80	15,524	869	60,464	94.48	164			
197	153B	1.2	3050112	30	43,673	974	166,871	260.74	167			
198	153B	1.2	3050112	40	19,328	1,425	45,924	71.76	269	198		
199	153B	1.2	3050112	50	4,170	264	52,389	81.86	51			
200	153B	1.1	3050112	60	18,442	902	60,780	94.97	194			
238	153B	1.1	3040205	180	18,050	764	85,530	133.64	135			
239	153B	1.2	3040207	40	22,985	767	106.170	165.89	139			
240	153B	1.1	3040207	50	3,325	236	45.617	71.28	47			
241	153B	2.3	3040207	30	8,695	1,115	28.794	44.99	193			
259	153B	1.3	3040201	170	18,172	804	74,945	117.10	155			
277	153B	1.1	3040206	130	13,594	623	70,714	110.49	123			
278	153B	1.2	3040206	140	26,756	944	102.631	160.36	167			
279	153B	1.3	3040206	150	2,860	290	37,334	58.33	49			
							MLRA 153B	TOTAL TONS	799332 TOTAL SQ MI 3,918 TONS /SQ MI 204 # OF WATERSHEDS	8	0	0
1	130	43.1	3060102	30	321,187	128.128	15.924	24.88	12,909		1	
2	130	27.7	3060102	60	827,147	92,267	58.823	91.91	8.999	2		
3	130	22.3	3060102	120	367,789	23.845	71.099	111.09	3,311			
6	130	45.2	3060101	20	25,967	5.632	31,245	48.82	532			

WSH #	MLRA	AVG SLOPE	CAT #	UNIT#	TONS	MG/L	AREA (ACRES)	AREA (SQ MI)	TONS/SQ MI		>WA	>2WA	>3WA
10	130	27.8	3060101	30	598,207	40,596	67,877	106.06	5.640		10		
106	130	29.2	3050109	10	581.387	57,918	45,914	71.74	8.104		106		
107	130	30.2	3050109	20	810,595	43,817	86,035	134.43	6,030		107		
108	130	25.5	3050109	30	29,730	6,729	29,130	45.52	653				
							MLRA 130	TOTAL TONS	3562009	TOTAL SQ MI 634 TONS /SQ MI 5,614 # OF WATERSHEDS	4	1	0
50	133	4.0	3050207	10	69,172	5,877	51,736	80.84	856		50		
51	133	3.8	3050207	20	33,640	8,358	16,576	25.90	1,299		51		
55	133	2.6	3050207	60	126,919	7,150	73,136	114.28	1.111		55		
63	133	4.3	3050204	30	102,282	8,673	78,315	122.37	836		63		
65	133	4.1	3050204	60	45,582	8,539	26,154	40.87	1.115		65		
66	133	3.5	3050204	70	32,477	6,609	23,644	36.94	879		66		
67	133	3.2	3050204	50	309,415	8,340	171,329	267.70	1,156		67		
73	133	3.4	3050203	60	59,087	5,083	57,034	89.12	663				
74	133	3.3	3050203	70	38,212	4,392	50,797	79.37	481				
83	133	3.2	3050206	10	64,585	5,746	54,098	84.53	764		83		
186	133	2.6	3050110	50	50,135	3,979	65,000	101.56	494				
187	133	2.9	3050110	60	32,404	4,782	36,513	57.05	568				
188	133	2.1	3050110	70	40,391	4,231	47,119	73.62	549				
189	133	2.1	3050111	10	101,547	4,451	122.568	191.51	530				
190	133	2.7	3050111	20	67,821	6.941	59,781	93.41	726		190		
191	133	2.8	3050111	29	11,310	7,209	9,558	14.93	757		191		
192	133	2.0	3050111	30	32,850	6,038	29,070	45.42	723		192		
193	133	1.7	3050111	40	17,243	4.449	19,828	30.98	557				
194	133	1.9	3050111	50	18,361	3,401	30,177	47.15	389				
211	133	2.5	3040202	90	125,433	5,849	115,135	179.90	697		211		
223	133	2.0	3040205	10	75,652	6.218	60.009	93.76	807		223		
225	133	2.8	3040205	60	84,539	7.281	59,614	93.15	908		225		
226	133	1.8	3040205	50	29,167	4,697	28,883	45.13	646				
227	133	2.9	3040205	80	68,909	5,070	98.667	154.17	447				
228	133	1.8	3040205	90	139,511	4,293	174,591	272.80	511				
245	133	3.2	3040201	33	24,549	9,553	16,398	25.62	958		245		
246	133	3.3	3040201	29	5,452	7,923	4.300	6.72	811		246		
247	133	4.5	3040201	19	5.093	101.670	5.842	9.13	558				
248	133	6.3	3040201	41	9.942	4.183	17,990	28.11	354				
249	133	2.5	3040201	50	193.145	4,287	231.862	362.28	533				
250	133	2.6	3040201	72	57.030	7.598	43,957	68.68	830		250		
251	133	2.2	3040201	97	5,891	5,560	6,771	10.58	557				
252	133	2.0	3040201	70	86,955	6.672	73,086	114.20	761		252		
254	133	1.8	3040201	130	111,453	4,282	145,431	227.24	490				
255	133	1.5	3040201	120	62,454	2,683	90,612	141.58	441				
260	133	2.6	3040204	15	27,086	7,367	25,571	39.95	678				
263	133	2.1	3040204	30	103,687	5,310	88,941	138.97	746		263		
264	133	2.5	3040204	49	1,490	8,617	1,591	2.49	599				
265	133	2.1	3040204	60	17,488	5,244	12,969	20.26	863		265		
270	133	1.4	3040203	215	35,258	4,445	34,447	53.82	655				
280	133	1.2	3040206	29	374	4,706	306	0.48	782		280		
							MLRA 133	TOTAL TONS	2523991	TOTAL SQ MI 3,687 TONS /SQ MI 685 # OF WATERSHEDS	21	0	0
4	136	13.2	3060102	130	451,211	50,977	38,965	60.88	7,411			4	
5	136	9.8	3060102	150	431,605	58.757	31,551	49.30	8.755			5	
7	136	19.3	3060101	50	710,327	34,122	94,219	147.22	4.825		7		
8	136	11.1	3060101	80	713.236	50,939	61.640	96.31	7,405			8	
9	136	10.7	3060101	40	1,271,749	49,261	111,320	173.94	7,312		9		
11	136	9.6	3060101	70	103,111	15,853	30,909	48.30	2,135				
12	136	13.7	3060101	60	870,078	50,849	75,330	117.70	7,392			12	

WSH #	MLRA	AVG SLOPE	CAT #	UNIT#	TONS	MG/L	AREA (ACRES)	AREA (SQ MI)	TONS/SQ MI	>WA	>2WA	>3WA
13	136	9.2	3060101	90	306,059	33,929	43.600	68.13	4.493	13		
14	136	9.5	3060101	100	476,877	47,810	50,134	78.33	6.088	14		
15	136	11.5	3060103	20	159.831	184,546	8,689	13.58	11,773			15
16	136	9.9	3060103	30	851.810	41,345	123,804	193.44	4,403	16		
17	136	9.5	3060103	80	180,369	40,823	27,736	43.34	4,162	17		
18	136	8.8	3060103	70	984,041	47,811	128.835	201.30	4,888	18		
19	136	10.7	3060103	100	78,193	7,843	72,296	112.96	692			
20	136	9.3	3060103	140	1,097,467	36,754	214,020	334.41	3.282			
21	136	9.2	3060103	150	377,620	18.609	152,706	238.60	1,583			
22	136	7.4	3060107	10	286,857	14,854	162,155	253.37	1,132			
23	136	7.2	3060107	20	368,059	20,611	150,165	234.63	1,569			
24	136	7.0	3060107	30	41,825	13,050	27,449	42.89	975			
25	136	8.7	3060107	40	112,089	7,708	144,077	225.12	498			
26	136	7.4	3060106	30	17,130	6.687	26.856	41.96	408			
109	136	11.6	3050109	40	678,009	34,104	84,423	131.91	5.140	109		
110	136	11.5	3050109	50	219,168	53.869	21.341	33.35	6,573	110		
111	136	10.0	3050109	60	208,915	38.489	25.650	40.08	5,213	111		
112	136	9.7	3050109	70	77,038	34,639	11,248	17.58	4.383	112		
113	136	10.8	3050109	80	1,009,242	30,038	162,650	254.14	3.971	113		
114	136	9.2	3050109	90	233,232	41,616	28,240	44.13	5.286	114		
115	136	10.3	3050109	100	301.153	21,801	73.689	115.14	2.616			
116	136	13.0	3050109	110	288,755	81.176	24.593	38.43	7.514		116	
117	136	12.6	3050109	120	544,150	62,616	56.648	88.51	6.148	117		
118	136	11.5	3050109	130	748,915	54.720	89,504	139.85	5.355	118		
119	136	8.0	3050109	140	308.215	20.371	100.338	156.78	1.966			
120	136	9.3	3050109	150	969.363	45.431	166.881	260.75	3.718	120		
121	136	10.8	3050109	160	481.120	45.137	80.104	125.16	3,844	121		
122	136	11.0	3050109	163	395,869	42.631	72.711	113.61	3,484			
123	136	7.2	3050109	170	1,004.447	52.643	148,792	232.49	4.320	123		
124	136	5.9	3050109	180	196,528	21,034	68,075	106.37	1.848			
125	136	7.7	3050109	190	454.428	45.765	107,129	167.39	2,715			
126	136	5.8	3050109	200	20.200	12,594	13.601	21.25	951			
127	136	6.8	3050109	210	89,795	8,972	61,185	95.60	939			
128	136	10.1	3050108	10	1,515,659	55.613	170.696	266.71	5.683	128		
129	136	12.3	3050108	20	243,055	21.329	72.375	113.09	2.149			
130	136	11.9	3050108	30	328.060	63,488	35,130	54.89	5,977	130		
131	136	11.9	3050108	40	383,091	33.880	68.431	106.92	3.583			
132	136	13.3	3050108	43	56,791	14,359	24,603	38.44	1,477			
133	136	12.5	3050108	50	391,993	22,587	119,969	187.45	2,091			
134	136	9.4	3050107	10	745,230	42,728	114,621	179.10	4,161	134		
135	136	10.0	3050107	20	162,893	37,484	26,155	40.87	3,986	135		
136	136	8.8	3050107	30	107,597	24,538	26,530	41.45	2.596			
137	136	8.9	3050107	40	587,972	38.868	65,505	102.35	5,745	137		
138	136	13.0	3050107	50	912,158	28,123	153,368	239.64	3,806	138		
139	136	11.5	3050107	60	973,798	29.472	156,156	243.99	3,991	139		
140	136	10.9	3050105	155	361,332	51,942	30.612	47.83	7,554		140	
141	136	9.5	3050105	160	664.451	50.801	56,362	88.07	7.545		141	
142	136	8.9	3050105	180	516.281	35,022	59,920	93.63	5.514	142		
143	136	10.8	3050105	170	1.152.227	58.497	84,612	132.21	8,715		143	
144	136	9.2	3050105	58	104.504	118.871	6,079	9.50	11,002			144
145	136	10.8	3050105	94	850,675	40,205	91,570	143.08	5,946	145		
146	136	7.0	3050105	110	132,806	38,916	14,777	23.09	5,752	146		
147	136	13.0	3050105	130	1,182,879	51,447	99,052	154.77	7,643		147	
148	136	6.9	3050105	109	98,583	40,076	15,213	23.77	4,147	148		

WSH #	MLRA	AVG SLOPE	CAT #	UNIT#	TONS	MG/L	AREA (ACRES)	AREA (SQ MI)	TONS/SQ MI		>WA	>2WA	>3WA
149	136	7.5	3050105	122	55,793	9,751	26.688	41.70	1,338				
150	136	13.3	3050105	142	958,000	51,167	77,287	120.76	7,933			150	
151	136	12.3	3050105	190	625,964	40,863	80,757	126.18	4.961		151		
152	136	9.0	3050101	190	239,391	25,672	41,475	64.80	3,694		152		
153	136	8.1	3050101	200	273,212	30,748	39,439	61.62	4,434		153		
154	136	16.7	3050106	10	427,030	24,256	78,463	122.60	3,483				
155	136	13.9	3050106	20	874,028	41,294	97,570	152.45	5,733		155		
156	136	12.1	3050106	30	149,771	21,053	35,169	54.95	2,726				
157	136	16.9	3050106	40	409,543	26,617	102,907	160.79	2,547				
158	136	14.8	3050106	50	587,798	30,952	143,543	224.29	2,621				
159	136	8.6	3050106	60	253,122	12,165	158,469	247.61	1,022				
160	136	14.4	3050106	70	244,194	16,050	120,423	188.16	1,298				
161	136	12.2	3050106	80	116,151	23,626	39,281	61.38	1,892				
162	136	8.8	3050106	90	84,155	11,204	61.738	96.47	872				
163	136	8.2	3050103	10	171,105	13.685	95.168	148.70	1,151				
164	136	7.8	3050103	28	78,374	19,542	28,052	43.83	1.788				
165	136	8.4	3050103	38	76,512	27,706	22,626	35.35	2,164				
166	136	5.9	3050103	50	113,867	31,383	27.420	42.84	2,658				
167	136	8.5	3050103	60	842.362	41.536	140,597	219.68	3,834		167		
168	136	11.3	3050103	70	80.249	40,123	15.677	24.50	3,276				
169	136	13.6	3050103	90	874,567	45,329	139,195	217.49	4,021		169		
170	136	9.1	3050103	42	628,620	36,807	128,786	201.23	3,124				
171	136	7.2	3050103	80	35,007	10,951	22.438	35.06	999				
172	136	18.6	3050104	10	599,975	42,374	167,751	262.11	2,289				
173	136	21.0	3050104	20	231,498	54,892	38,757	60.56	3,823		173		
175	136	10.8	3050104	40	83,161	21,133	45,113	70.49	1,180				
176	136	7.2	3050104	50	71,161	16,639	39,281	61.38	1,159				
201	136	9.2	3040105	80	29,945	223,283	1,799	2.81	10,653			201	
202	136	8.8	3040104	60	39,385	105,960	4,507	7.04	5,593		202		
203	136	8.7	3040202	15	125,167	88,555	17,772	27.77	4,507		203		
204	136	8.6	3040202	20	72,437	77,814	9,983	15.60	4,644		204		
205	136	4.9	3040202	50	67,627	16,750	30,572	47.77	1,416				
206	136	8.5	3040202	30	135.835	29.081	38,115	59.55	2,281				
207	136	7.0	3040202	40	32,714	13,015	30,404	47.51	689				
208	136	7.4	3040202	70	105,769	16,004	79,847	124.76	848				
							MLRA 136	TOTAL TONS	39383610	TOTAL SQ MI 10,769 TONS /SQ MI 3,657 # OF WATERSHEDS	39	11	2
27	137	5.2	3060106	50	32,448	3,595	101,356	158.37	205				
28	137	4.2	3060106	60	155,352	7,984	119,840	187.25	830		28		
29	137	5.8	3060106	100	109,026	5,631	141,369	220.89	494				
30	137	3.2	3060106	110	13,421	1,040	86,519	135.19	99				
31	137	3.1	3060106	130	52,210	3,661	108,225	169.10	309				
52	137	3.6	3050207	30	18,087	6,692	11,626	18.17	996		52		
56	137	2.6	3050207	70	42,740	4,258	38,777	60.59	705				
61	137	4.7	3050204	20	152,052	8,844	96,038	150.06	1,013		61		
62	137	5.5	3050204	10	209,111	10,203	141,962	221.82	943		62		
64	137	5.4	3050204	40	78,461	9,915	40,398	63.12	1,243		64		
68	137	5.5	3050203	10	46,923	7,067	54,375	84.96	552				
69	137	5.6	3050203	30	24,858	5,533	41,377	64.65	384				
70	137	4.9	3050203	20	33,859	5,491	63,241	98.81	343				
71	137	4.6	3050203	40	209,031	10,857	122,341	191.16	1,093		71		
72	137	5.1	3050203	50	103,855	10,969	55.136	86.15	1,206		72		
174	137	3.9	3050104	30	197,973	5,239	232,079	362.62	546				
177	137	6.0	3050104	60	77,455	10,889	79.630	124.42	623				
178	137	4.9	3050104	70	19,512	5,930	43,343	67.72	288				

WSH #	MLRA	AVG SLOPE	CAT #	UNIT#	TONS	MG/L	AREA (ACRES)	AREA (SQ MI)	TONS/SQ MI		>WA	>2WA	>3WA
179	137	5.9	3050104	80	111.684	15.100	43.323	67.69	1.650			179	
180	137	3.4	3050104	90	10,174	1,780	50.806	79.38	128				
181	137	7.5	3050104	100	14,513	1,948	47,821	74.72	194				
182	137	3.7	3050110	10	50,034	2,300	139,619	218.15	229				
183	137	5.8	3050110	20	46.539	3.653	100,683	157.32	296				
184	137	4.8	3050110	30	27,499	3,486	46,427	72.34	379				
185	137	5.9	3050110	40	17,651	4,353	33,330	52.08	339				
209	137	4.8	3040202	60	156,031	11,166	123.586	193.10	808		209		
210	137	4.6	3040202	80	20,890	5,054	51.310	80.17	261				
221	137	4.6	3040205	30	168,836	14,314	71,949	112.42	1,502			221	
222	137	3.4	3040205	40	17,892	7,303	13,146	20.54	871		222		
242	137	5.7	3040201	62	561,464	21,006	184,890	288.89	1,944			242	
243	137	5.2	3040201	100	179,711	10,814	110.628	172.86	1,040		243		
244	137	5.1	3040201	80	57,140	8,409	49,265	76.98	742		244		
253	137	2.7	3040201	110	244,380	6,600	206,705	322.98	757		253		
							MLRA 137	TOTAL TONS	3260812	TOTAL SQ MI 4,455 TONS /SQ MI 732 # OF WATERSHEDS	12	3	0
										# OF WATERSHEDS	117	15	2

A P P E N D I X B

$SEDCAD^+$ INPUTS BY WATERSHED

WATERSHED	AVERAGE S	AVERAGE K	AVERAGE % Osa	AVERAGE % Osi	AVERAGE % Ocl	AVERAGE L	HSG CURVE #	CP CURVE #	TIME OF CONCENTRATION	% FINER SIZE (MM) 0.001	0.003	0.004	0.052	0.063	0.635	1.177	ACRES
1	43.05	0.22	0.60	0.28	0.12	100.00	71.18	0.056	1.13	0%	1%	2%	7%	8%	76%	100%	15,923.99
2	27.66	0.22	0.60	0.28	0.13	102.94	69.28	0.097	1.83	0%	2%	2%	6%	6%	76%	100%	58,822.89
3	22.34	0.23	0.58	0.27	0.14	107.83	66.29	0.09	8.16	0%	2%	3%	4%	5%	76%	100%	71,099.49
4	13.21	0.25	0.56	0.27	0.17	151.77	67.75	0.357	8.08	0%	2%	4%	2%	2%	76%	100%	38,964.85
5	9.83	0.26	0.60	0.27	0.13	181.24	68.88	0.619	6.36	0%	2%	3%	4%	5%	76%	100%	31,551.45
6	45.24	0.23	0.61	0.28	0.12	100.00	67.62	0.003	2.56	0%	1%	2%	6%	7%	76%	100%	31,245.03
7	19.34	0.24	0.58	0.28	0.14	133.51	67.40	0.132	6.09	0%	2%	3%	4%	5%	76%	100%	94,219.43
8	11.11	0.26	0.58	0.27	0.13	175.98	67.76	0.39	8.95	0%	2%	3%	4%	5%	76%	100%	61,639.99
9	10.74	0.26	0.59	0.27	0.14	176.67	69.10	0.360	12.15	0%	2%	3%	4%	5%	76%	100%	111,319.68
10	27.77	0.23	0.59	0.28	0.13	101.60	66.02	0.110	6.48	0%	2%	3%	5%	6%	76%	100%	67,877.13
11	9.55	0.26	0.59	0.27	0.14	175.37	69.95	0.19	8.39	0%	2%	3%	4%	5%	76%	100%	30,908.95
12	13.73	0.25	0.59	0.27	0.14	152.47	68.28	0.31	6.54	0%	2%	3%	5%	5%	76%	100%	75,330.07
13	9.21	0.26	0.61	0.27	0.12	190.82	68.83	0.41	10.45	0%	1%	2%	6%	6%	76%	100%	43,600.70
14	9.46	0.26	0.61	0.27	0.12	186.92	68.05	0.54	10.08	0%	1%	2%	6%	7%	76%	100%	50,134.38
15	11.45	0.26	0.59	0.27	0.15	182.41	68.61	0.631	1.35	0%	2%	3%	3%	4%	76%	100%	8,688.51
16	9.94	0.26	0.60	0.27	0.13	195.67	68.98	0.353	7.84	0%	2%	3%	5%	5%	76%	100%	123,803.85
17	9.52	0.26	0.62	0.27	0.11	185.55	67.93	0.455	7.45	0%	1%	2%	6%	7%	76%	100%	27,736.02
18	8.76	0.26	0.61	0.27	0.11	197.55	68.37	0.486	14.50	0%	1%	2%	6%	7%	76%	100%	128,835.08
19	10.73	0.30	0.51	0.35	0.14	190.99	66.96	0.048	5.76	0%	2%	3%	9%	11%	76%	100%	72,295.52
20	9.27	0.26	0.60	0.26	0.12	199.40	66.71	0.307	18.63	0%	2%	2%	5%	6%	76%	100%	214,020.04
21	9.20	0.26	0.62	0.26	0.12	202.94	66.33	0.160	15.37	0%	1%	2%	5%	6%	76%	100%	152,706.24
22	7.36	0.33	0.44	0.42	0.14	236.26	66.53	0.124	16.28	0%	2%	3%	14%	16%	76%	100%	162,155.86
23	7.23	0.35	0.36	0.49	0.15	237.42	66.40	0.170	14.82	0%	2%	3%	18%	21%	76%	100%	150,165.92
24	6.97	0.31	0.45	0.41	0.14	246.86	66.43	0.151	10.40	0%	2%	3%	13%	16%	76%	100%	27,449.36
25	8.71	0.24	0.64	0.25	0.11	224.52	62.07	0.073	12.09	0%	1%	2%	5%	6%	76%	100%	144,077.04
26	7.42	0.20	0.69	0.21	0.10	283.94	68.99	0.062	4.40	0%	1%	2%	3%	3%	76%	100%	26,856.29
27	5.20	0.12	0.82	0.12	0.07	375.00	55.76	0.115	19.73	0%	1%	1%	1%	1%	76%	100%	101,356.06
28	4.23	0.17	0.70	0.19	0.10	366.11	73.33	0.238	11.87	0%	1%	2%	3%	3%	76%	100%	119,840.15
29	5.80	0.13	0.78	0.14	0.07	340.84	69.35	0.143	15.65	0%	1%	1%	2%	2%	76%	100%	141,368.68
30	3.16	0.14	0.70	0.16	0.09	360.98	67.21	0.060	18.37	0%	1%	2%	2%	2%	76%	100%	86,519.37
31	3.08	0.13	0.80	0.13	0.07	375.00	66.61	0.265	20.48	0%	1%	1%	1%	1%	76%	100%	108,225.82
32	1.88	0.16	0.67	0.20	0.11	370.84	77.44	0.279	10.99	0%	1%	2%	3%	3%	76%	100%	69,715.65
33	1.33	0.21	0.55	0.30	0.15	375.00	84.64	0.195	29.45	0%	2%	3%	5%	6%	76%	100%	95,109.03
34	1.16	0.20	0.64	0.24	0.11	374.93	86.49	0.157	20.25	0%	1%	2%	5%	5%	76%	100%	79,807.77
35	1.02	0.13	0.28	0.46	0.26	375.00	94.13	0.054	3.58	0%	7%	10%	10%	10%	76%	100%	36,078.57
36	1.43	0.14	0.77	0.15	0.08	375.00	78.88	0.406	16.52	0%	1%	1%	2%	2%	76%	100%	88,842.24
37	1.40	0.15	0.77	0.16	0.08	375.00	80.69	0.529	11.39	0%	1%	1%	2%	3%	76%	100%	51,419.37
38	1.25	0.13	0.76	0.16	0.08	375.00	80.88	0.362	15.06	0%	1%	1%	2%	3%	76%	100%	72,710.67
39	1.17	0.17	0.69	0.21	0.09	375.04	87.48	0.241	13.19	0%	1%	2%	4%	5%	76%	100%	57,765.25
40	1.09	0.19	0.52	0.33	0.16	375.00	88.35	0.094	20.12	0%	2%	3%	7%	7%	76%	100%	93,389.12
41	1.06	0.12	0.37	0.40	0.23	375.00	88.68	0.084	14.90	0%	5%	7%	7%	7%	76%	100%	28,170.94
42	1.84	0.08	0.51	0.30	0.19	364.61	89.91	0.091	8.64	0%	3%	5%	2%	2%	76%	100%	58,753.70
43	1.17	0.13	0.52	0.31	0.17	375.00	85.86	0.225	16.27	0%	3%	4%	5%	5%	76%	100%	217,430.20
44	1.56	0.08	0.41	0.37	0.22	367.87	89.82	0.199	15.01	0%	4%	7%	4%	4%	76%	100%	125,543.53
45	1.16	0.12	0.54	0.30	0.16	375.00	86.49	0.195	31.73	0%	2%	3%	4%	5%	76%	100%	207,002.02
46	1.03	0.10	0.34	0.42	0.24	375.00	93.76	0.111	11.55	0%	5%	8%	7%	7%	76%	100%	51,864.18
47	1.30	0.15	0.71	0.19	0.09	375.04	80.84	0.255	24.72	0%	1%	2%	3%	4%	76%	100%	103,026.55
48	1.12	0.16	0.64	0.24	0.11	375.00	85.84	0.190	16.37	0%	1%	2%	5%	6%	76%	100%	97,293.52
49	1.21	0.15	0.74	0.18	0.08	375.04	80.32	0.298	17.13	0%	1%	1%	3%	3%	76%	100%	66,394.45
50	3.95	0.14	0.78	0.15	0.08	374.96	73.79	0.329	10.49	0%	1%	1%	2%	2%	76%	100%	51,735.68
51	3.83	0.15	0.76	0.16	0.08	375.00	77.25	0.486	7.66	0%	1%	1%	2%	2%	76%	100%	16,576.37
52	3.56	0.15	0.77	0.15	0.08	375.00	75.20	0.451	13.09	0%	1%	1%	2%	2%	76%	100%	111,626.10
53	1.42	0.16	0.75	0.17	0.08	374.96	76.90	0.538	22.68	0%	1%	1%	3%	3%	76%	100%	97,283.63

WATERSHED	AVERAGE S	AVERAGE K	AVERAGE % Dsa	AVERAGE % Dsi	AVERAGE % Dcl	AVERAGE L	HSG CURVE #	CP CURVE #	TIME OF CONCENTRATION	% FINER SIZE (MM) 0.001	0.003	0.004	0.052	0.063	0.635	1.177	ACRES
54	1.49	0.15	0.72	0.19	0.09	375.08	82.42	0.330	22.42	0%	1%	1%	3%	4%	76%	100%	106,911.17
55	2.62	0.16	0.73	0.18	0.09	375.00	77.24	0.476	16.78	0%	1%	1%	3%	3%	76%	100%	73,135.70
56	2.59	0.15	0.73	0.18	0.09	375.00	79.60	0.306	10.46	0%	1%	1%	3%	3%	76%	100%	38,777.05
57	1.32	0.16	0.74	0.18	0.08	375.00	78.36	0.358	12.59	0%	1%	1%	3%	3%	76%	100%	34,665.08
58	1.53	0.16	0.72	0.19	0.09	374.96	81.33	0.327	14.77	0%	1%	2%	3%	4%	76%	100%	43,165.78
59	1.23	0.16	0.72	0.19	0.09	374.96	77.14	0.268	16.00	0%	1%	1%	3%	4%	76%	100%	51,409.49
60	1.28	0.15	0.73	0.19	0.09	375.00	84.96	0.321	12.76	0%	1%	1%	3%	4%	76%	100%	47,327.17
61	4.68	0.12	0.81	0.12	0.07	374.74	65.90	0.344	17.59	0%	1%	1%	1%	1%	76%	100%	96,038.18
62	5.46	0.13	0.81	0.12	0.07	363.65	66.26	0.272	16.12	0%	1%	1%	1%	1%	76%	100%	141,961.75
63	4.28	0.13	0.79	0.14	0.07	375.00	67.44	0.333	11.97	0%	1%	1%	2%	2%	76%	100%	78,315.20
64	5.39	0.12	0.82	0.11	0.06	375.04	72.62	0.376	10.19	0%	1%	1%	1%	1%	76%	100%	40,398.11
65	4.07	0.13	0.81	0.12	0.07	375.04	73.96	0.536	6.14	0%	1%	1%	1%	1%	76%	100%	26,154.49
66	3.54	0.14	0.78	0.15	0.07	375.00	74.95	0.513	8.52	0%	1%	1%	2%	2%	76%	100%	23,643.82
67	3.20	0.15	0.72	0.19	0.09	375.08	77.15	0.492	17.67	0%	1%	2%	3%	3%	76%	100%	171,328.71
68	5.52	0.13	0.82	0.11	0.06	297.44	61.92	0.225	8.09	0%	1%	1%	1%	1%	76%	100%	54,374.85
69	5.59	0.12	0.83	0.11	0.06	293.96	59.42	0.192	14.16	0%	1%	1%	1%	1%	76%	100%	41,376.68
70	4.86	0.11	0.84	0.10	0.06	368.74	55.98	0.211	12.61	0%	1%	1%	1%	1%	76%	100%	63,241.28
71	4.39	0.13	0.80	0.13	0.07	369.15	67.93	0.374	15.79	0%	1%	1%	1%	1%	76%	100%	122,340.94
72	5.05	0.13	0.79	0.14	0.07	342.81	69.46	0.403	11.49	0%	1%	1%	2%	2%	76%	100%	55,135.96
73	3.37	0.14	0.76	0.16	0.08	375.00	73.51	0.378	10.75	0%	1%	1%	2%	3%	76%	100%	57,033.79
74	3.31	0.14	0.76	0.16	0.08	375.04	69.85	0.319	12.25	0%	1%	1%	2%	3%	76%	100%	50,796.65
75	1.95	0.16	0.68	0.22	0.10	375.04	80.15	0.347	11.12	0%	1%	2%	4%	5%	76%	100%	58,832.78
76	1.43	0.17	0.69	0.21	0.10	374.96	82.78	0.172	17.62	0%	1%	2%	4%	4%	76%	100%	92,005.29
77	1.39	0.17	0.71	0.20	0.09	374.59	84.58	0.309	15.14	0%	1%	2%	4%	4%	76%	100%	36,641.99
78	1.21	0.15	0.74	0.18	0.09	374.96	81.04	0.161	15.27	0%	1%	1%	3%	3%	76%	100%	43,650.12
79	1.48	0.17	0.70	0.21	0.09	375.04	73.89	0.345	23.33	0%	1%	2%	4%	4%	76%	100%	102,334.63
80	1.14	0.13	0.76	0.16	0.08	375.00	82.24	0.087	6.90	0%	1%	1%	2%	2%	76%	100%	14,184.31
81	1.22	0.14	0.56	0.29	0.15	375.00	88.12	0.118	24.72	0%	2%	3%	5%	5%	76%	100%	142,643.78
82	1.24	0.11	0.51	0.31	0.18	375.00	87.01	0.335	9.75	0%	3%	4%	4%	3%	76%	100%	95,968.99
83	2.39	0.15	0.74	0.18	0.08	375.04	74.68	0.541	8.14	0%	1%	1%	3%	3%	76%	100%	54,098.08
84	1.46	0.17	0.70	0.21	0.09	375.04	75.93	0.473	19.41	0%	1%	2%	4%	5%	76%	100%	69,063.27
85	1.43	0.17	0.71	0.20	0.09	375.00	74.93	0.424	20.18	0%	1%	2%	4%	4%	76%	100%	50,836.18
86	1.43	0.17	0.69	0.22	0.09	375.00	80.37	0.294	15.74	0%	1%	2%	4%	5%	76%	100%	65,593.80
87	1.39	0.17	0.70	0.21	0.09	375.00	72.94	0.617	17.03	0%	1%	2%	4%	5%	76%	100%	20,273.19
88	1.53	0.17	0.70	0.21	0.09	374.96	69.77	0.587	9.49	0%	1%	2%	4%	5%	76%	100%	13,769.16
89	1.34	0.17	0.70	0.21	0.09	374.10	78.40	0.290	14.16	0%	1%	2%	4%	4%	76%	100%	71,020.41
90	1.20	0.18	0.66	0.24	0.10	375.00	79.90	0.184	15.87	0%	1%	2%	5%	6%	76%	100%	91,471.52
91	1.13	0.19	0.62	0.27	0.11	375.00	81.11	0.117	17.31	0%	1%	2%	6%	7%	76%	100%	90,038.27
92	1.36	0.24	0.51	0.36	0.13	375.00	77.45	0.193	14.44	0%	2%	3%	10%	12%	76%	100%	61,956.29
93	1.44	0.16	0.70	0.20	0.10	375.00	79.46	0.108	10.41	0%	1%	2%	4%	4%	76%	100%	23,327.51
94	1.56	0.14	0.58	0.26	0.15	375.00	84.18	0.066	13.32	0%	2%	3%	2%	2%	76%	100%	41,692.99
95	1.43	0.16	0.63	0.24	0.13	375.00	88.20	0.094	17.10	0%	2%	2%	4%	4%	76%	100%	143,928.77
96	1.12	0.08	0.32	0.43	0.26	375.00	91.63	0.055	23.19	0%	6%	10%	6%	5%	76%	100%	86,993.83
97	1.25	0.10	0.43	0.36	0.21	375.00	90.27	0.228	11.39	0%	4%	6%	4%	4%	76%	100%	52,694.48
98	1.16	0.16	0.71	0.20	0.09	375.00	83.91	0.169	6.47	0%	1%	2%	3%	4%	76%	100%	39,300.93
99	1.13	0.15	0.67	0.23	0.10	375.00	87.04	0.115	12.86	0%	1%	2%	4%	5%	76%	100%	72,542.63
100	1.12	0.13	0.57	0.29	0.15	375.00	84.41	0.135	11.85	0%	2%	3%	5%	5%	76%	100%	43,343.70
101	1.16	0.14	0.69	0.21	0.10	375.00	81.72	0.028	16.42	0%	1%	2%	3%	4%	76%	100%	104,608.08
102	1.26	0.12	0.57	0.28	0.16	375.00	85.04	0.074	16.37	0%	2%	3%	3%	3%	76%	100%	44,203.66
103	1.12	0.15	0.59	0.28	0.13	375.00	85.87	0.081	14.52	0%	2%	3%	5%	6%	76%	100%	50,618.72
104	1.25	0.14	0.58	0.28	0.14	375.00	85.42	0.044	10.31	0%	2%	3%	4%	5%	76%	100%	38,361.90
105	1.28	0.13	0.61	0.25	0.14	375.00	81.41	0.105	16.09	0%	2%	3%	3%	3%	76%	100%	60,463.73
106	29.16	0.24	0.60	0.27	0.13	133.49	66.02	0.124	6.41	0%	2%	2%	5%	6%	76%	100%	45,913.68

	AVERAGE	AVERAGE	AVERAGE	AVERAGE	AVERAGE	AVERAGE	HSG	CP	TIME OF	% FINER SIZE (MM)							
WATERSHED	S	K	% Dsa	% Dsi	% Dcl	L	CURVE #	CURVE #	CONCENTRATION	0.001	0.003	0.004	0.052	0.063	0.635	1.177	ACRES
107	30.24	0.23	0.61	0.27	0.12	109.32	65.91	0.092	5.61	0%	1%	2%	6%	7%	76%	100%	86,035.03
108	25.48	0.23	0.58	0.28	0.14	106.53	65.75	0.138	4.19	0%	2%	3%	5%	5%	76%	100%	29,129.74
109	11.58	0.26	0.58	0.27	0.15	175.50	70.27	0.221	12.34	0%	2%	3%	3%	3%	76%	100%	84,423.85
110	11.47	0.26	0.59	0.27	0.15	186.39	69.79	0.286	4.41	0%	2%	3%	3%	3%	76%	100%	21,340.72
111	10.04	0.26	0.61	0.27	0.12	185.78	69.75	0.428	5.84	0%	2%	2%	5%	6%	76%	100%	25,650.38
112	9.74	0.26	0.61	0.27	0.12	189.95	70.20	0.385	5.06	0%	2%	2%	5%	6%	76%	100%	11,248.61
113	10.76	0.26	0.61	0.25	0.13	188.10	68.94	0.223	10.70	0%	2%	3%	3%	3%	76%	100%	162,650.09
114	9.23	0.26	0.61	0.27	0.12	204.76	68.23	0.503	7.99	0%	2%	2%	5%	6%	76%	100%	28,240.13
115	10.33	0.26	0.61	0.27	0.13	188.64	73.87	0.183	10.58	0%	2%	2%	5%	5%	76%	100%	73,689.24
116	13.04	0.25	0.56	0.27	0.17	156.34	69.03	0.519	5.23	0%	3%	4%	1%	1%	76%	100%	24,592.73
117	12.57	0.26	0.58	0.26	0.15	170.53	69.19	0.397	9.59	0%	2%	3%	3%	3%	76%	100%	56,648.29
118	11.47	0.25	0.61	0.25	0.14	181.99	68.77	0.377	11.30	0%	2%	3%	2%	2%	76%	100%	89,504.50
119	7.98	0.26	0.63	0.25	0.12	244.13	68.58	0.213	10.98	0%	2%	2%	4%	4%	76%	100%	100,337.96
120	9.33	0.29	0.53	0.33	0.13	205.08	68.31	0.340	14.76	0%	2%	3%	9%	10%	76%	100%	166,880.67
121	10.83	0.26	0.60	0.26	0.14	197.89	68.62	0.305	9.83	0%	2%	3%	4%	4%	76%	100%	80,104.30
122	10.95	0.26	0.63	0.25	0.12	192.22	67.85	0.286	9.28	0%	1%	2%	4%	5%	76%	100%	72,710.67
123	7.21	0.37	0.32	0.52	0.16	231.78	67.61	0.425	12.37	0%	2%	3%	20%	23%	76%	100%	148,791.97
124	5.90	0.26	0.56	0.32	0.11	273.68	69.58	0.320	10.21	0%	1%	2%	9%	11%	76%	100%	68,074.82
125	7.72	0.32	0.43	0.42	0.14	234.88	67.44	0.263	4.71	0%	2%	3%	14%	16%	76%	100%	107,128.63
126	5.78	0.20	0.72	0.19	0.09	277.63	66.67	0.278	5.55	0%	1%	2%	3%	3%	76%	100%	13,601.13
127	6.80	0.22	0.63	0.27	0.10	253.78	70.97	0.148	10.98	0%	1%	2%	7%	8%	76%	100%	61,185.30
128	10.18	0.26	0.60	0.27	0.14	198.29	69.98	0.401	15.71	0%	2%	3%	4%	5%	76%	100%	170,696.10
129	12.28	0.26	0.60	0.26	0.14	163.87	70.47	0.139	12.25	0%	2%	3%	3%	3%	76%	100%	72,374.59
130	11.89	0.26	0.58	0.27	0.15	182.06	67.95	0.442	6.52	0%	2%	3%	3%	3%	76%	100%	35,129.65
131	11.93	0.26	0.60	0.26	0.14	176.08	71.21	0.229	8.73	0%	2%	3%	4%	4%	76%	100%	68,430.66
132	13.34	0.26	0.61	0.26	0.13	149.91	70.59	0.095	5.60	0%	2%	3%	4%	4%	76%	100%	24,602.62
133	12.54	0.26	0.61	0.26	0.13	157.02	67.94	0.135	11.42	0%	2%	3%	4%	4%	76%	100%	119,968.65
134	9.36	0.26	0.58	0.27	0.15	194.57	68.67	0.393	16.32	0%	2%	3%	4%	4%	76%	100%	114,621.11
135	10.04	0.27	0.55	0.28	0.17	198.74	69.49	0.368	39.08	0%	3%	4%	2%	1%	76%	100%	26,154.49
136	8.76	0.27	0.60	0.27	0.14	205.49	69.05	0.284	7.54	0%	2%	3%	4%	4%	76%	100%	26,530.10
137	8.91	0.26	0.60	0.27	0.13	204.33	68.52	0.404	13.76	0%	2%	2%	5%	6%	76%	100%	65,504.84
138	13.11	0.26	0.59	0.26	0.15	153.19	70.37	0.174	14.01	0%	2%	3%	2%	2%	76%	100%	153,368.51
139	11.45	0.26	0.60	0.25	0.15	172.97	70.35	0.205	15.22	0%	2%	3%	3%	3%	76%	100%	156,155.95
140	10.87	0.26	0.58	0.27	0.14	173.69	68.12	0.448	9.24	0%	2%	3%	4%	4%	76%	100%	30,612.42
141	9.51	0.26	0.60	0.27	0.13	198.50	68.72	0.497	10.31	0%	2%	3%	5%	5%	76%	100%	56,361.64
142	8.94	0.26	0.62	0.27	0.11	199.06	72.17	0.345	10.09	0%	1%	2%	6%	7%	76%	100%	59,920.08
143	10.75	0.25	0.60	0.27	0.13	172.74	68.56	0.461	9.74	0%	2%	3%	5%	5%	76%	100%	84,611.65
144	9.22	0.26	0.63	0.25	0.12	199.39	68.29	0.581	1.51	0%	1%	2%	5%	5%	76%	100%	6,078.99
145	10.81	0.31	0.44	0.41	0.15	192.41	68.79	0.236	13.54	0%	2%	3%	13%	15%	76%	100%	91,570.37
146	6.99	0.30	0.52	0.36	0.12	224.75	69.49	0.560	7.43	0%	2%	2%	10%	12%	76%	100%	14,777.39
147	12.95	0.27	0.53	0.32	0.15	166.11	69.21	0.282	9.69	0%	2%	3%	7%	8%	76%	100%	99,052.97
148	6.89	0.37	0.30	0.54	0.16	225.00	68.55	0.271	3.73	0%	2%	4%	21%	25%	76%	100%	15,212.31
149	7.50	0.36	0.27	0.57	0.16	225.00	65.68	0.107	6.71	0%	2%	4%	23%	27%	76%	100%	26,688.26
150	13.29	0.28	0.54	0.32	0.13	189.28	70.89	0.236	9.03	0%	2%	3%	8%	9%	76%	100%	77,287.21
151	12.26	0.26	0.58	0.27	0.15	161.41	67.45	0.286	10.69	0%	2%	3%	3%	3%	76%	100%	80,756.68
152	9.02	0.27	0.53	0.31	0.16	186.29	68.08	0.286	8.43	0%	2%	4%	6%	6%	76%	100%	41,475.53
153	8.14	0.26	0.58	0.27	0.14	212.44	67.70	0.391	7.57	0%	2%	3%	4%	4%	76%	100%	39,439.31
154	16.70	0.25	0.60	0.25	0.14	117.80	72.59	0.120	7.97	0%	2%	3%	3%	3%	76%	100%	78.463.47
155	13.93	0.25	0.63	0.23	0.14	180.74	70.69	0.222	8.75	0%	2%	3%	1%	1%	76%	100%	97,570.28
156	12.10	0.26	0.61	0.25	0.15	140.04	68.62	0.178	5.63	0%	2%	3%	2%	2%	76%	100%	35,169.19
157	16.90	0.25	0.61	0.24	0.15	136.26	71.61	0.114	6.54	0%	2%	3%	1%	0%	76%	100%	102,907.94
158	14.80	0.26	0.57	0.26	0.17	137.03	69.28	0.147	9.05	0%	3%	4%	1%	1%	76%	100%	143,543.28
159	8.64	0.29	0.47	0.39	0.14	236.67	68.58	0.095	14.53	0%	2%	3%	12%	14%	76%	100%	158,468.93

	AVERAGE	AVERAGE	AVERAGE	AVERAGE	AVERAGE	AVERAGE	HSG	CP	TIME OF	% FINER SIZE (MM)							
WATERSHED	S	K	% Osa	% Osi	% Ocl	L	CURVE #	CURVE #	CONCENTRATION	0.001	0.003	0.004	0.052	0.063	0.635	1.177	ACRES
160	14.37	0.25	0.58	0.26	0.16	143.90	68.12	0.081	12.28	0%	2%	3%	2%	2%	76%	100%	120,423.34
161	12.19	0.24	0.61	0.21	0.17	163.24	67.04	0.165	5.70	0%	3%	4%	-3%	-4%	76%	100%	39,281.16
162	8.78	0.33	0.41	0.43	0.16	205.51	66.21	0.088	8.98	0%	2%	3%	14%	16%	76%	100%	61,738.83
163	8.20	0.30	0.50	0.35	0.15	209.55	68.85	0.125	14.51	0%	2%	3%	8%	9%	76%	100%	95,168.34
164	7.75	0.27	0.55	0.30	0.15	204.25	70.57	0.256	6.50	0%	2%	3%	5%	5%	76%	100%	28,052.32
165	8.41	0.29	0.52	0.32	0.16	220.15	66.71	0.291	8.71	0%	2%	4%	6%	7%	76%	100%	22,625.71
166	5.86	0.27	0.63	0.26	0.12	274.60	69.29	0.509	9.74	0%	1%	2%	5%	5%	76%	100%	27,419.71
167	8.52	0.26	0.61	0.25	0.14	226.46	71.46	0.395	13.93	0%	2%	3%	3%	3%	76%	100%	140,597.68
168	11.33	0.26	0.56	0.29	0.16	159.86	68.14	0.346	6.20	0%	2%	4%	4%	4%	76%	100%	15,676.88
169	13.57	0.25	0.60	0.24	0.15	155.28	70.45	0.243	9.49	0%	2%	3%	1%	1%	76%	100%	139,974.96
170	9.10	0.31	0.46	0.39	0.15	217.33	68.80	0.268	9.62	0%	2%	3%	11%	13%	76%	100%	128,785.66
171	7.22	0.23	0.63	0.24	0.13	261.70	70.72	0.170	6.89	0%	2%	2%	4%	4%	76%	100%	22,437.90
172	18.56	0.25	0.60	0.26	0.14	134.55	68.68	0.078	4.42	0%	2%	3%	4%	4%	76%	100%	167,750.51
173	20.95	0.24	0.62	0.24	0.14	105.94	73.10	0.139	4.36	0%	2%	3%	3%	3%	76%	100%	38,757.28
174	3.92	0.16	0.60	0.21	0.11	351.33	71.82	0.233	28.58	0%	2%	2%	3%	3%	76%	100%	232,079.09
175	10.77	0.24	0.56	0.32	0.11	246.30	57.01	0.152	9.86	0%	1%	2%	9%	11%	76%	100%	45,113.04
176	7.21	0.32	0.39	0.44	0.14	242.88	62.95	0.173	10.37	0%	2%	3%	16%	19%	76%	100%	39,281.16
177	6.00	0.21	0.56	0.28	0.10	312.48	57.06	0.188	15.78	0%	1%	2%	8%	9%	76%	100%	79,629.85
178	4.85	0.11	0.85	0.10	0.06	375.00	49.10	0.317	17.60	0%	1%	1%	0%	0%	76%	100%	43,343.70
179	5.93	0.14	0.77	0.15	0.08	318.90	73.23	0.447	9.04	0%	1%	1%	2%	2%	76%	100%	43,323.93
180	3.43	0.14	0.58	0.19	0.10	373.57	63.34	0.113	19.20	0%	1%	2%	3%	3%	76%	100%	50,806.53
181	7.54	0.15	0.74	0.17	0.09	289.69	71.01	0.039	9.17	0%	1%	1%	2%	2%	76%	100%	47,821.40
182	3.70	0.12	0.55	0.15	0.08	321.90	70.94	0.155	18.98	0%	1%	2%	3%	3%	76%	100%	139,619.11
183	5.84	0.12	0.81	0.11	0.06	272.41	66.31	0.115	13.23	0%	1%	1%	1%	1%	76%	100%	100,683.91
184	4.80	0.14	0.72	0.14	0.07	327.30	73.42	0.130	10.57	0%	1%	1%	2%	2%	76%	100%	46,427.68
185	5.85	0.12	0.79	0.11	0.06	262.23	65.36	0.155	7.19	0%	1%	1%	1%	1%	76%	100%	33,330.67
186	2.63	0.19	0.62	0.25	0.13	357.21	76.47	0.278	15.34	0%	2%	2%	4%	5%	76%	100%	65,000.73
187	2.88	0.19	0.65	0.24	0.11	348.24	75.10	0.320	12.54	0%	1%	2%	4%	4%	76%	100%	36,513.49
188	2.12	0.21	0.57	0.29	0.15	365.38	76.18	0.336	15.98	0%	2%	3%	5%	5%	76%	100%	47,119.60
189	2.10	0.18	0.65	0.24	0.12	373.67	74.01	0.354	10.76	0%	1%	2%	4%	4%	76%	100%	122,568.28
190	2.70	0.17	0.70	0.20	0.10	375.00	70.74	0.487	14.36	0%	1%	2%	3%	3%	76%	100%	59,781.69
191	2.79	0.15	0.75	0.17	0.08	375.00	68.92	0.691	7.54	0%	1%	1%	3%	3%	76%	100%	9,558.35
192	1.99	0.18	0.70	0.20	0.10	375.00	71.67	0.594	10.77	0%	1%	2%	4%	4%	76%	100%	29,070.43
193	1.74	0.17	0.69	0.21	0.10	375.00	73.27	0.558	9.94	0%	1%	2%	4%	4%	76%	100%	19,828.39
194	1.90	0.15	0.73	0.18	0.09	375.00	70.89	0.408	8.65	0%	1%	2%	3%	3%	76%	100%	30,177.50
195	1.39	0.21	0.50	0.32	0.17	375.00	84.69	0.170	16.49	0%	3%	4%	5%	6%	76%	100%	113,879.77
196	1.38	0.21	0.51	0.33	0.16	375.00	85.73	0.279	10.72	0%	2%	4%	6%	7%	76%	100%	34,744.15
197	1.22	0.18	0.57	0.29	0.14	375.00	86.80	0.082	19.97	0%	2%	3%	5%	6%	76%	100%	166,870.79
198	1.20	0.18	0.57	0.29	0.14	375.00	86.11	0.133	16.89	0%	2%	3%	5%	6%	76%	100%	45,923.57
199	1.23	0.15	0.72	0.19	0.10	375.00	81.66	0.029	16.29	0%	1%	2%	3%	3%	76%	100%	52,388.06
200	1.10	0.11	0.39	0.39	0.23	375.00	87.37	0.131	12.36	0%	5%	7%	5%	4%	76%	100%	60,780.03
201	9.16	0.38	0.27	0.57	0.16	225.00	68.71	0.668	0.72	0%	2%	4%	23%	27%	76%	100%	1,798.99
202	8.77	0.34	0.37	0.49	0.15	235.53	68.94	0.563	2.22	0%	2%	3%	18%	21%	76%	100%	4,507.35
203	8.69	0.37	0.27	0.56	0.16	225.00	67.48	0.438	4.24	0%	2%	4%	23%	27%	76%	100%	17,772.40
204	8.55	0.33	0.38	0.47	0.14	243.57	69.05	0.429	4.48	0%	2%	3%	17%	20%	76%	100%	9,983.38
205	4.85	0.15	0.79	0.14	0.07	370.64	68.34	0.521	8.50	0%	1%	1%	2%	2%	76%	100%	30,572.88
206	8.45	0.30	0.45	0.40	0.15	223.33	65.76	0.271	9.96	0%	2%	3%	12%	14%	76%	100%	38,114.78
207	7.07	0.21	0.63	0.26	0.11	284.69	53.80	0.232	10.77	0%	1%	2%	6%	7%	76%	100%	30,404.84
208	7.43	0.20	0.66	0.25	0.09	302.64	54.13	0.240	15.52	0%	1%	2%	6%	7%	76%	100%	79,847.31
209	4.84	0.12	0.81	0.12	0.07	374.96	61.90	0.365	19.64	0%	1%	1%	1%	1%	76%	100%	123,586.39
210	4.55	0.12	0.80	0.13	0.07	375.00	52.62	0.227	19.62	0%	1%	1%	1%	1%	76%	100%	51,310.64
211	2.47	0.17	0.66	0.23	0.11	375.00	74.41	0.428	31.37	0%	1%	2%	4%	4%	76%	100%	115,135.11
212	1.63	0.20	0.55	0.30	0.16	375.00	72.64	0.559	8.89	0%	2%	3%	5%	5%	76%	100%	10,438.07

WATERSHED	AVERAGE S	AVERAGE K	AVERAGE % Osa	AVERAGE % Osi	AVERAGE % Ocl	AVERAGE L	HSG CURVE #	CP CURVE #	TIME OF CONCENTRATION	% FINER SIZE (MM) 0.001	0.003	0.004	0.052	0.063	0.635	1.177	ACRES
213	1.60	0.17	0.70	0.20	0.09	375.00	73.79	0.602	32.34	0%	1%	2%	4%	4%	76%	100%	111,260.37
214	1.44	0.16	0.71	0.20	0.09	375.00	73.90	0.518	23.97	0%	1%	2%	4%	4%	76%	100%	39,874.23
215	1.42	0.15	0.73	0.18	0.09	375.00	78.60	0.511	10.10	0%	1%	1%	3%	3%	76%	100%	15,953.65
216	1.37	0.16	0.71	0.20	0.09	375.00	79.72	0.440	16.43	0%	1%	2%	3%	4%	76%	100%	35,920.41
217	1.26	0.20	0.59	0.28	0.13	375.00	77.99	0.327	32.86	0%	2%	3%	5%	6%	76%	100%	103,886.50
218	1.28	0.15	0.74	0.17	0.08	375.00	79.81	0.401	13.88	0%	1%	1%	3%	3%	76%	100%	34,526.69
219	1.11	0.16	0.71	0.20	0.09	375.00	77.99	0.430	14.66	0%	1%	2%	3%	4%	76%	100%	32,747.48
220	1.64	0.17	0.69	0.21	0.10	375.00	74.26	0.357	16.08	0%	1%	2%	4%	4%	76%	100%	40,576.03
221	4.58	0.14	0.75	0.16	0.08	375.00	71.11	0.492	13.15	0%	1%	1%	2%	2%	76%	100%	71,949.56
222	3.38	0.15	0.74	0.18	0.09	375.00	74.16	0.585	8.20	0%	1%	1%	3%	3%	76%	100%	13,146.44
223	1.99	0.15	0.71	0.19	0.09	375.00	75.56	0.693	17.75	0%	1%	2%	3%	3%	76%	100%	60,009.04
224	1.55	0.15	0.74	0.17	0.09	375.00	75.45	0.540	8.07	0%	1%	1%	3%	3%	76%	100%	9,568.23
225	2.78	0.15	0.74	0.17	0.09	374.24	74.91	0.601	13.54	0%	1%	1%	3%	3%	76%	100%	59,613.65
226	1.81	0.16	0.68	0.22	0.10	375.00	79.13	0.528	12.44	0%	1%	2%	4%	4%	76%	100%	28,882.62
227	2.88	0.14	0.77	0.16	0.08	375.00	67.31	0.360	13.46	0%	1%	1%	2%	2%	76%	100%	98,667.47
228	1.75	0.15	0.73	0.18	0.09	375.00	74.46	0.442	30.91	0%	1%	1%	3%	3%	76%	100%	174,590.61
229	1.54	0.16	0.70	0.21	0.10	375.00	78.26	0.361	22.51	0%	1%	2%	4%	4%	76%	100%	83,267.36
230	1.52	0.15	0.74	0.18	0.09	375.00	76.55	0.424	26.06	0%	1%	1%	3%	3%	76%	100%	120,719.87
231	1.42	0.16	0.72	0.19	0.09	375.00	79.75	0.282	11.65	0%	1%	1%	3%	4%	76%	100%	24,711.35
232	1.34	0.16	0.73	0.19	0.09	375.00	79.55	0.339	17.55	0%	1%	1%	3%	4%	76%	100%	40,477.19
233	1.36	0.15	0.74	0.18	0.08	375.00	77.29	0.411	21.72	0%	1%	1%	3%	3%	76%	100%	50,114.61
234	1.41	0.17	0.71	0.20	0.09	375.00	77.28	0.360	23.36	0%	1%	2%	4%	4%	76%	100%	148,821.62
235	1.25	0.17	0.72	0.19	0.09	375.00	79.64	0.354	15.03	0%	1%	2%	3%	4%	76%	100%	84,552.35
236	1.17	0.15	0.68	0.22	0.10	375.00	83.07	0.198	22.44	0%	1%	2%	4%	5%	76%	100%	117,082.36
237	1.16	0.15	0.69	0.21	0.10	375.00	81.11	0.192	16.75	0%	1%	2%	4%	4%	76%	100%	83,771.47
238	1.12	0.17	0.62	0.25	0.12	375.00	83.30	0.077	16.49	0%	2%	2%	4%	5%	76%	100%	85,530.92
239	1.22	0.16	0.65	0.24	0.11	375.00	83.88	0.075	18.63	0%	1%	2%	4%	5%	76%	100%	106,169.83
240	1.11	0.10	0.55	0.28	0.17	375.00	82.62	0.041	12.05	0%	3%	4%	2%	2%	76%	100%	45,617.15
241	2.31	0.12	0.75	0.16	0.09	375.00	76.58	0.113	30.47	0%	1%	2%	1%	1%	76%	100%	28,793.66
242	5.66	0.19	0.69	0.22	0.09	345.28	68.24	0.366	18.99	0%	1%	2%	5%	5%	76%	100%	184,890.30
243	5.15	0.13	0.81	0.12	0.07	375.00	68.60	0.318	16.38	0%	1%	1%	1%	1%	76%	100%	110,627.76
244	5.11	0.13	0.82	0.11	0.07	375.00	66.87	0.272	11.35	0%	1%	1%	1%	1%	76%	100%	49,264.54
245	3.18	0.22	0.64	0.24	0.11	373.01	69.79	0.507	10.37	0%	1%	2%	4%	5%	76%	100%	16,398.45
246	3.32	0.26	0.42	0.40	0.17	323.35	72.30	0.378	5.15	0%	3%	4%	11%	13%	76%	100%	4,299.77
247	4.52	0.15	0.77	0.15	0.08	318.18	66.91	0.321	3.90	0%	1%	1%	2%	2%	76%	100%	5,841.76
248	6.32	0.15	0.76	0.16	0.08	256.31	65.66	0.121	7.32	0%	1%	1%	3%	3%	76%	100%	17,989.86
249	2.54	0.20	0.56	0.29	0.15	361.65	74.91	0.252	29.08	0%	2%	3%	5%	5%	76%	100%	231,861.63
250	2.60	0.18	0.71	0.20	0.09	369.60	72.32	0.552	17.12	0%	1%	2%	3%	4%	76%	100%	43,956.54
251	2.18	0.19	0.67	0.23	0.10	375.00	70.35	0.534	6.70	0%	1%	2%	5%	5%	76%	100%	6,770.91
252	2.01	0.20	0.63	0.26	0.11	375.00	73.19	0.519	18.99	0%	1%	2%	5%	6%	76%	100%	73,086.28
253	2.68	0.15	0.74	0.17	0.09	375.00	70.81	0.468	33.97	0%	1%	1%	3%	3%	76%	100%	206,705.48
254	1.77	0.17	0.70	0.20	0.10	375.00	71.01	0.391	36.68	0%	1%	2%	3%	4%	76%	100%	145,431.22
255	1.45	0.24	0.47	0.36	0.17	375.00	84.58	0.165	17.58	0%	3%	4%	8%	9%	76%	100%	90,611.57
256	1.74	0.19	0.63	0.25	0.12	375.00	76.60	0.389	30.84	0%	1%	2%	5%	5%	76%	100%	107,860.09
257	1.68	0.22	0.50	0.33	0.17	375.00	81.09	0.168	15.22	0%	3%	4%	6%	7%	76%	100%	63,251.17
258	1.27	0.18	0.60	0.27	0.13	375.00	84.27	0.211	17.53	0%	2%	3%	5%	5%	76%	100%	102,987.01
259	1.28	0.19	0.53	0.31	0.16	375.00	87.24	0.063	19.84	0%	2%	4%	5%	5%	76%	100%	74,944.57
260	2.59	0.17	0.72	0.19	0.09	375.00	67.77	0.568	16.78	0%	1%	1%	3%	3%	76%	100%	25,571.30
261	1.45	0.22	0.57	0.30	0.13	375.00	80.09	0.454	26.52	0%	2%	2%	7%	8%	76%	100%	106,970.48
262	1.28	0.22	0.56	0.32	0.12	375.00	80.80	0.598	6.07	0%	2%	2%	9%	10%	76%	100%	5,238.81
263	2.07	0.18	0.67	0.23	0.10	375.00	79.62	0.416	22.69	0%	1%	2%	4%	5%	76%	100%	88,941.08
264	2.52	0.16	0.70	0.20	0.09	375.00	73.33	0.504	2.52	0%	1%	2%	4%	4%	76%	100%	1,591.41
265	2.12	0.17	0.71	0.20	0.09	375.00	85.05	0.433	6.92	0%	1%	2%	3%	4%	76%	100%	12,968.52

WATERSHED	AVERAGE S	AVERAGE K	AVERAGE % Dsa	AVERAGE % Dsi	AVERAGE % Dcl	AVERAGE L	HSG CURVE #	CP CURVE #	TIME OF CONCENTRATION	% FINER SIZE (MM) 0.001	0.003	0.004	0.052	0.063	0.635	1.177	ACRES
266	1.26	0.18	0.63	0.25	0.11	375.00	83.64	0.226	29.65	0%	1%	2%	5%	6%	76%	100%	206,843.86
267	1.25	0.17	0.73	0.19	0.09	375.00	78.50	0.375	16.89	0%	1%	1%	3%	4%	76%	100%	50,223.34
268	1.18	0.17	0.72	0.19	0.09	375.00	78.83	0.385	21.37	0%	1%	1%	3%	4%	76%	100%	104,479.58
269	1.10	0.17	0.68	0.22	0.10	375.00	84.07	0.327	12.11	0%	1%	2%	4%	5%	76%	100%	29,040.78
270	1.43	0.19	0.67	0.23	0.10	375.00	79.85	0.453	15.45	0%	1%	2%	4%	5%	76%	100%	34,447.62
271	1.26	0.16	0.67	0.23	0.10	375.00	86.43	0.269	9.34	0%	1%	2%	4%	5%	76%	100%	50,806.53
272	1.22	0.16	0.74	0.18	0.08	375.00	77.78	0.384	10.04	0%	1%	1%	3%	3%	76%	100%	8,668.74
273	1.08	0.17	0.66	0.24	0.11	375.00	82.51	0.250	13.55	0%	1%	2%	5%	5%	76%	100%	23,110.05
274	1.15	0.16	0.67	0.23	0.10	375.00	78.49	0.383	14.17	0%	1%	2%	4%	5%	76%	100%	32,727.71
275	1.20	0.16	0.68	0.22	0.10	375.00	80.13	0.350	17.00	0%	1%	2%	4%	5%	76%	100%	84,572.12
276	1.09	0.16	0.64	0.25	0.11	375.00	82.84	0.213	12.07	0%	1%	2%	5%	6%	76%	100%	35,455.84
277	1.07	0.13	0.74	0.17	0.08	375.00	87.56	0.078	15.47	0%	1%	1%	3%	3%	76%	100%	70,713.99
278	1.21	0.13	0.68	0.22	0.10	375.00	83.11	0.116	18.15	0%	1%	2%	4%	4%	76%	100%	102,631.17
279	1.31	0.11	0.67	0.21	0.12	375.00	80.50	0.047	17.23	0%	1%	2%	3%	3%	76%	100%	37,333.90
280	1.15	0.18	0.53	0.32	0.14	375.00	95.55	0.232	0.80	0%	2%	3%	7%	8%	76%	100%	306.42

A P P E N D I X C

AVERAGE VALUES FOR EACH SOIL MAPPING UNIT

MAPPING UNIT #	MLRA	TOTAL ACRES	AVE % SLOPE	AVE HSG	AVE ERODIBILITY	AVE SAND	AVE SILT	AVE CLAY	AVE LENGTH
SC001	136	552,210	11.08	2.18	0.25	0.61	0.28	0.11	150.00
SC002	136	1,037,610	7.80	2.06	0.27	0.62	0.26	0.11	225.00
SC003	136	91,520	3.50	3.15	0.29	0.58	0.30	0.12	300.00
SC004	136	41,300	4.32	2.02	0.27	0.64	0.26	0.11	300.00
SC005	136	337,810	5.27	2.14	0.27	0.65	0.24	0.11	300.00
SC006	136	506,230	14.95	2.08	0.25	0.55	0.27	0.18	150.00
SC007	136	94,040	4.48	2.00	0.22	0.72	0.19	0.09	300.00
SC008	136	56,480	6.68	2.00	0.28	0.64	0.26	0.11	225.00
SC009	136	47,290	14.03	2.33	0.26	0.63	0.23	0.13	150.00
SC010	136	95,580	11.54	2.77	0.26	0.62	0.25	0.13	150.00
SC011	136	31,810	9.61	2.25	0.27	0.64	0.25	0.11	225.00
SC012	136	27,180	4.88	2.43	0.28	0.64	0.25	0.10	300.00
SC013	136	310,020	9.17	2.27	0.38	0.27	0.57	0.16	225.00
SC014	136	176,680	7.61	2.30	0.36	0.26	0.58	0.16	225.00
SC015	136	635,930	6.65	2.26	0.38	0.31	0.53	0.16	225.00
SC016	136	2,130	1.30	2.56	0.25	0.50	0.35	0.15	300.00
SC017	136	28,150	8.88	2.23	0.21	0.66	0.24	0.10	225.00
SC018	133A	91,950	3.12	1.77	0.12	0.80	0.13	0.07	375.00
SC019	137	285,140	5.15	1.15	0.11	0.86	0.09	0.05	375.00
SC020	136	22,460	12.79	2.05	0.20	0.69	0.16	0.15	150.00
SC021	136	2,760	14.73	2.28	0.19	0.69	0.21	0.10	150.00
SC022	136	113,550	15.66	2.31	0.24	0.63	0.25	0.12	100.00
SC023	136	61,790	5.25	2.30	0.23	0.71	0.19	0.10	300.00
SC024	136	15,090	5.36	2.33	0.25	0.63	0.18	0.19	300.00
SC025	136	222,980	17.20	2.76	0.27	0.58	0.27	0.15	100.00
SC026	136	7,780	16.08	2.26	0.29	0.45	0.30	0.25	100.00
SC027	136	26,590	6.74	2.04	0.28	0.57	0.26	0.17	225.00
SC028	136	8,210	13.68	2.10	0.27	0.45	0.30	0.25	150.00
SC029	136	49,770	4.57	2.00	0.26	0.62	0.26	0.11	300.00
SC030	136	116,000	17.41	2.13	0.25	0.49	0.29	0.22	100.00
SC031	136	61,530	13.54	2.00	0.22	0.62	0.24	0.14	150.00
SC032	136	22,530	12.57	2.59	0.25	0.60	0.24	0.16	150.00
SC033	136	52,440	10.08	2.00	0.26	0.63	0.21	0.16	150.00
SC034									
SC035	136	351,640	21.47	2.92	0.24	0.62	0.24	0.13	100.00
SC036	136	56,310	18.26	2.87	0.25	0.62	0.25	0.13	100.00
SC037	136	280,710	11.63	2.28	0.24	0.60	0.24	0.16	150.00
SC038	136	22,050	15.85	2.20	0.22	0.65	0.22	0.13	100.00
SC039	136	107,540	7.86	2.03	0.26	0.61	0.17	0.22	225.00
SC040	136	101,390	24.03	2.10	0.22	0.65	0.25	0.10	100.00
SC041	136	4,880	9.36	2.83	0.27	0.53	0.30	0.16	225.00
SC042	136	42,480	8.59	2.43	0.27	0.56	0.28	0.16	225.00
SC043	136	294,080	10.17	2.11	0.25	0.55	0.28	0.17	150.00
SC044	130	105,640	19.98	2.47	0.22	0.62	0.27	0.11	100.00
SC045	130	74,040	38.31	2.52	0.22	0.59	0.29	0.12	100.00
SC046	136	207,050	23.11	2.08	0.24	0.57	0.28	0.15	100.00
SC047	137	40,720	5.24	1.40	0.10	0.87	0.08	0.05	375.00
SC048	136	22,440	5.87	2.96	0.22	0.61	0.26	0.13	300.00
SC049	137	330,820	6.13	1.73	0.12	0.82	0.11	0.06	250.00
SC050	137	204,820	4.59	1.30	0.11	0.84	0.10	0.06	375.00
SC051	133A	62,662	5.55	1.96	0.13	0.79	0.14	0.07	375.00
SC052	137	145,720	5.90	1.59	0.12	0.84	0.10	0.06	375.00
SC053	137	87,348	6.29	1.66	0.13	0.82	0.12	0.07	250.00

MAPPING UNIT #	MLRA	TOTAL ACRES	AVE % SLOPE	AVE HSG	AVE ERODIBILITY	AVE SAND	AVE SILT	AVE CLAY	AVE LENGTH
SC054	137	38,210	9.15	2.72	0.15	0.77	0.16	0.08	250.00
SC055	153A	394,140	1.16	3.34	0.28	0.19	0.52	0.29	375.00
SC056	133A	68,865	1	0.22	0.01	0.05	0.05	0.02	375.00
SC057	137	26,220	6.86	2.14	0.12	0.83	0.11	0.06	250.00
SC058	133A	138,340	1.00	3.74	0.26	0.46	0.37	0.16	375.00
SC059	133A	63,470	2.08	2.20	0.18	0.70	0.21	0.09	375.00
SC060	133A	24,160	1.18	2.30	0.16	0.75	0.17	0.08	375.00
SC061	133A	146,270	2.25	2.15	0.18	0.72	0.19	0.09	375.00
SC062	133A	314,430	3.90	2.06	0.14	0.79	0.14	0.07	375.00
SC063	153A	290,650	1.12	3.62	0.18	0.51	0.34	0.15	375.00
SC064	133A	28,440	1.00	2.82	0.30	0.41	0.42	0.18	375.00
SC065	133A	10,920	1.00	3.75	0.26	0.44	0.36	0.20	375.00
SC066	137	344,560	5.12	1.78	0.11	0.84	0.10	0.06	375.00
SC067	137	125,136	7.01	2.40	0.12	0.81	0.12	0.07	375.00
SC068	137	53,520	3.94	1.70	0.11	0.84	0.10	0.06	375.00
SC069	133A	75,480	3.82	2.76	0.15	0.74	0.18	0.09	375.00
SC070	153A	66,300	1.30	2.74	0.17	0.72	0.19	0.09	375.00
SC071	153A	397,620	1.42	2.70	0.15	0.73	0.18	0.09	375.00
SC072	153A	74,680	1.33	2.56	0.16	0.72	0.19	0.09	375.00
SC073	153A	10,040	1.00	3.67	0.21	0.67	0.21	0.13	375.00
SC074	153A	74,230	1.71	2.24	0.11	0.81	0.13	0.07	375.00
SC075	153A	582,470	1.27	2.52	0.17	0.72	0.19	0.09	375.00
SC076	153A	51,400	1.00	2.59	0.17	0.70	0.21	0.09	375.00
SC077	153A	46,455	1	3.38	0.13	0.69	0.22	0.09	375.00
SC078	153B	50,010	1.06	3.15	0.14	0.71	0.20	0.09	375.00
SC079	153B	161,798	1.12	2.67	0.12	0.81	0.13	0.08	375.00
SC080	153B	26,500	1.00	2.86	0.14	0.68	0.22	0.10	375.00
SC081	153B	517,790	1.18	3.55	0.16	0.64	0.25	0.11	375.00
SC082	153B	43,250	1.00	3.77	0.19	0.55	0.31	0.14	375.00
SC083	153B	334,240	0.92	4.00	0.08	0.23	0.49	0.28	375.00
SC084	153B	577,222	1	4.00	0.06	0.10	0.56	0.34	375.00
SC085	153B	8,600	12.40	1.40	0.10	0.88	0.07	0.05	150.00
SC086	153B	117,870	1.66	2.38	0.10	0.86	0.08	0.05	375.00
SC087	153B	32,920	1.18	3.26	0.15	0.66	0.23	0.11	375.00
SC088	153B	114,420	1.18	3.27	0.16	0.67	0.22	0.11	375.00
SC089	153B	140,780	1.00	3.92	0.25	0.49	0.36	0.15	375.00
SC090	153B	47,900	1.00	3.36	0.21	0.67	0.23	0.10	375.00
SC091	153A	136,868	1.27	3.04	0.12	0.76	0.16	0.08	375.00
SC092	153A	19,030	1.00	2.88	0.20	0.64	0.26	0.10	375.00
SC093	153B	29,850	1	4.00	0.37	0.10	0.57	0.34	375.00
SC094	153B	76,010	1.65	2.92	0.13	0.79	0.14	0.07	375.00
SC095	153B	91,610	1.09	2.10	0.11	0.85	0.10	0.06	375.00
SC096	153B	17,410	1.00	3.79	0.15	0.46	0.37	0.16	375.00
SC097	153B	452,620	1.12	2.95	0.15	0.73	0.18	0.09	375.00
SC098	153B	34,290	1.00	3.93	0.05	0.53	0.33	0.14	375.00
SC099	153B	4,460	1.00	3.77	0.17	0.47	0.37	0.16	375.00
SC100	153A	43,410	2.44	2.02	0.13	0.79	0.14	0.07	375.00
SC101	153A	79,420	1.24	3.57	0.24	0.50	0.35	0.15	375.00
SC102	153A	98,690	1.27	3.39	0.24	0.52	0.35	0.13	375.00
SC103	153A	8,540	1.00	3.71	0.17	0.57	0.29	0.13	375.00
SC104	133A	145,650	1.42	2.65	0.19	0.69	0.22	0.10	375.00
SC105	133A	27,140	1.99	2.32	0.13	0.75	0.17	0.08	375.00
SC106	153B	33,650	3.01	1.60	0.11	0.84	0.10	0.06	375.00

MAPPING UNIT #	MLRA	TOTAL ACRES	AVE % SLOPE	AVE HSG	AVE ERODIBILITY	AVE SAND	AVE SILT	AVE CLAY	AVE LENGTH
SC107	153B	68,690	1.06	2.10	0.14	0.80	0.13	0.07	375.00
SC108	153A	94,220	1.10	3.61	0.20	0.56	0.31	0.14	375.00
SC109	153B	460,500	1.00	3.82	0.17	0.62	0.27	0.11	375.00
SC110	153B	125,700	1.06	3.16	0.15	0.66	0.24	0.10	375.00
SC111	153A	96,890	1.45	2.35	0.18	0.75	0.17	0.08	375.00
SC112	153A	109,530	1.09	2.68	0.16	0.73	0.18	0.08	375.00
SC113	153A	346,110	1.62	2.43	0.17	0.70	0.21	0.09	375.00
SC114	153A	29527.4	3.33	1.45	0.12	0.85	0.10	0.06	375.00
SC115	133A	98,760	2.91	2.03	0.13	0.78	0.15	0.07	375.00
SC116	133A	58,670	1.27	2.47	0.17	0.71	0.20	0.09	375.00
SC117	133A	133,760	3.90	2.00	0.13	0.83	0.11	0.06	375.00
SC118	153B	174,140	1.00	3.81	0.17	0.64	0.25	0.10	375.00
SC119	153A	41,900	1.00	2.54	0.12	0.82	0.11	0.06	375.00
SC120	153B	60,780	1.73	2.94	0.22	0.71	0.20	0.09	375.00
SC121	137	102,670	3.50	1.84	0.14	0.76	0.16	0.08	375.00
SC122	153B	43,470	1.06	3.85	0.12	0.60	0.28	0.12	375.00
SC123	153A	25,340	1.57	2.76	0.19	0.66	0.24	0.10	375.00
SC124	153A	64,960	1.00	3.29	0.33	0.34	0.50	0.16	375.00
SC125	153B	21,310	1.57	3.09	0.16	0.68	0.21	0.11	375.00
SC126	153B	73,030	1.48	2.83	0.14	0.80	0.13	0.07	375.00
SC127	153B	14,355	3.46	1.87	0.19	0.69	0.15	0.16	375.00
SC128	153B	71,190	1.84	2.74	0.17	0.69	0.21	0.10	375.00
SC129	153B	56,790	1.24	3.31	0.16	0.73	0.18	0.09	375.00
SC130	133A	151,620	3.28	1.94	0.14	0.78	0.14	0.08	375.00
SC131	153A	8,530	1.75	2.79	0.13	0.77	0.15	0.08	375.00
SC132	133A	9,530	1.84	2.96	0.20	0.69	0.22	0.09	375.00
SC133	133A	56,500	1.00	3.84	0.24	0.54	0.32	0.14	375.00
SC134	153A	5,880	0.80	3.55	0.04	0.83	0.11	0.06	375.00
SC135	133A	466,110	2.01	2.30	0.14	0.76	0.16	0.08	375.00
SC136	133A	53,840	1.00	4.00	0.19	0.49	0.36	0.16	375.00
SC137	133A	53,010	8.22	2.17	0.14	0.81	0.13	0.07	250.00
SC138	133A	33,210	2.40	2.23	0.15	0.77	0.16	0.08	375.00
SC139	133A	369,390	1.30	2.28	0.18	0.70	0.21	0.09	375.00
SC140	137	33,570	5.79	2.26	0.15	0.73	0.18	0.09	375.00
SC141	137	50,370	6.00	1.84	0.14	0.80	0.13	0.07	375.00
SC142	133A	104,440	2.56	2.46	0.17	0.72	0.19	0.09	375.00
SC143	133A	16,370	1.00	3.09	0.30	0.28	0.50	0.23	375.00
SC144	133A	16,611	2.32	2.33	0.20	0.69	0.21	0.10	375.00
SC145	133A	43,480	3.71	2.34	0.19	0.75	0.17	0.08	375.00
SC146	136	10,595	9.02	2.47	0.34	0.38	0.47	0.15	225.00
SC147	137	84,080	4.71	1.96	0.15	0.80	0.13	0.07	375.00
SC148	137	222,410	5.69	1.52	0.12	0.85	0.09	0.06	375.00
SC149	137	16,840	7.87	2.58	0.12	0.72	0.19	0.09	250.00
SC150	153A	22,290	1.48	1.55	0.13	0.79	0.14	0.07	375.00
SC151	153A	9,450	1.00	4.00	0.19	0.66	0.24	0.10	375.00
SC152	153A	71,540	1.78	2.21	0.16	0.74	0.18	0.08	375.00
SC153	153A	78,290	1.15	2.10	0.13	0.81	0.12	0.07	375.00
SC154	153A	33,040	1.84	2.49	0.22	0.71	0.20	0.09	375.00
SC155	153A	38,350	1.72	2.29	0.11	0.80	0.13	0.07	375.00
SC156	153A	30,200	2.14	1.22	0.13	0.84	0.10	0.06	375.00
SC157	153A	54,350	2.74	1.88	0.12	0.83	0.11	0.06	375.00
SC158	136	92,169	56.21	2.31	0.23	0.62	0.27	0.11	100.00
SC159	-	-	-	-	-	-	-	-	-

MAPPING UNIT #	MLRA	TOTAL ACRES	AVE % SLOPE	AVE HSG	AVE ERODIBILITY	AVE SAND	AVE SILT	AVE CLAY	AVE LENGTH
SC160	153A	3,010	1.36	3.06	0.15	0.76	0.16	0.08	375.00

APPENDIX D

LAND USE BY WATERSHED

WATERSHED #	CAT #	UNIT #	URBAN (ACRES)	%	AGRICULTURE (ACRES)	%	PASTURELAND (ACRES)	%	FOREST (ACRES)	%	WATER (ACRES)	%	FORESTED WETLANDS (ACRES)	%	UNFORESTED WETLANDS (ACRES)	%	BARE (ACRES)	%	TOTAL (ACRES)
1	3060102	30	0	0.00	0	0.00	0	0.00	15,222	95.18	69	0.43	0	0.00	0	0.00	702	4.39	15,993
2	3060102	60	0	0.00	5,911	9.91	0	0.00	52,774	88.50	603	1.01	0	0.00	158	0.27	188	0.31	59,633
3	3060102	120	1,493	2.08	6,109	8.52	0	0.00	63,123	88.01	227	0.32	0	0.00	0	0.00	771	1.07	71,722
4	3060102	130	1,661	3.37	14,382	29.18	0	0.00	24,306	49.32	6,623	13.44	0	0.00	0	0.00	2,313	4.69	49,284
5	3060102	150	1,018	2.78	22,230	60.84	0	0.00	9,835	26.89	3,469	9.49	0	0.00	0	0.00	0	0.00	36,573
6	3060101	20	257	0.64	0	0.00	0	0.00	32,382	80.97	7,354	18.39	0	0.00	0	0.00	0	0.00	39,993
7	3060101	50	6,741	6.36	11,664	11.00	0	0.00	76,921	72.56	9,331	8.80	0	0.00	0	0.00	1,354	1.28	106,012
8	3060101	80	5,950	9.48	25,838	41.17	0	0.00	29,792	47.46	524	0.83	0	0.00	0	0.00	662	1.06	62,767
9	3060101	40	17,446	12.55	43,541	31.33	0	0.00	59,890	43.09	16,774	12.07	0	0.00	0	0.00	1,344	0.97	138,996
10	3060101	30	366	0.48	7,987	10.48	0	0.00	61,413	80.57	6,395	8.39	0	0.00	0	0.00	59	0.08	76,220
11	3060101	70	7,651	24.71	4,932	15.93	0	0.00	17,466	56.42	30	0.10	0	0.00	0	0.00	880	2.84	30,958
12	3060101	60	7,641	10.10	24,751	32.71	0	0.00	42,405	56.04	336	0.44	0	0.00	0	0.00	534	0.71	75,666
13	3060101	90	4,903	11.22	19,690	45.07	0	0.00	19,048	43.60	0	0.00	0	0.00	0	0.00	49	0.11	43,690
14	3060101	100	1,641	3.24	30,019	59.25	0	0.00	18,326	36.17	366	0.72	0	0.00	0	0.00	316	0.62	50,668
15	3060103	20	79	0.64	6,623	53.56	0	0.00	2,837	22.94	2,827	22.86	0	0.00	0	0.00	0	0.00	12,366
16	3060103	30	11,881	8.56	48,523	34.95	0	0.00	77,920	56.12	465	0.33	0	0.00	0	0.00	49	0.04	138,838
17	3060103	80	959	3.26	13,977	47.48	0	0.00	14,006	47.58	494	1.68	0	0.00	0	0.00	0	0.00	29,436
18	3060103	70	10,675	8.17	69,627	53.28	0	0.00	49,215	37.66	1,058	0.81	0	0.00	0	0.00	109	0.08	130,683
19	3060103	100	1,226	1.30	3,460	3.66	0	0.00	71,386	75.43	18,375	19.42	0	0.00	0	0.00	188	0.20	94,635
20	3060103	140	5,436	2.49	72,078	33.06	0	0.00	137,761	63.18	1,404	0.64	109	0.05	0	0.00	1,245	0.57	218,033
21	3060103	150	3,400	2.45	28,191	20.28	0	0.00	106,664	76.73	544	0.39	0	0.00	0	0.00	208	0.15	139,006
22	3060107	10	2,600	1.60	21,449	13.22	0	0.00	137,790	84.92	99	0.06	0	0.00	0	0.00	316	0.19	162,255
23	3060107	20	1,453	0.97	23,565	15.68	0	0.00	121,965	81.15	128	0.09	0	0.00	0	0.00	3,183	2.12	150,294
24	3060107	30	1,107	4.02	4,497	16.33	0	0.00	21,845	79.33	89	0.32	0	0.00	0	0.00	0	0.00	27,538
25	3060107	40	455	0.31	10,132	7.00	0	0.00	132,660	91.67	642	0.44	0	0.00	0	0.00	830	0.57	144,720
26	3060106	30	5,160	17.33	1,334	4.48	0	0.00	20,184	67.80	2,906	9.76	0	0.00	0	0.00	188	0.63	29,772
27	3060106	50	13,067	12.80	8,283	8.11	0	0.00	76,902	75.31	751	0.74	79	0.08	0	0.00	3,025	2.96	102,107
28	3060106	60	4,053	3.33	28,527	23.46	0	0.00	65,030	53.47	2,758	2.27	18,543	15.25	49	0.04	2,649	2.18	121,609
29	3060106	100	1,611	1.13	12,257	8.62	109	0.08	111,903	78.71	395	0.28	8,511	5.99	0	0.00	7,394	5.20	142,179
30	3060106	110	1,473	1.63	5,476	6.05	0	0.00	62,391	68.91	2,283	2.52	18,356	20.27	237	0.26	326	0.36	90,542
31	3060106	130	623	0.55	30,326	26.64	573	0.50	68,480	60.16	3,044	2.67	9,588	8.42	69	0.06	1,127	0.99	113,830
32	3060106	140	59	0.08	22,230	31.07	0	0.00	27,766	38.81	1,819	2.54	19,206	26.84	316	0.44	148	0.21	71,544
33	3060109	20	217	0.22	21,746	21.86	49	0.05	37,532	37.73	4,270	4.29	35,604	35.79	40	0.04	20	0.02	99,478
34	3060109	50	356	0.44	13,651	17.03	1,236	1.54	31,255	38.99	346	0.43	33,173	41.39	0	0.00	138	0.17	80,154
35	3060109	60	741	1.88	1,364	3.46	0	0.00	10,863	27.53	3,341	8.47	7,453	18.89	15,015	38.05	682	1.73	39,459
36	3050208	50	2,303	2.58	39,805	44.59	0	0.00	22,092	24.75	425	0.48	24,524	27.47	10	0.01	109	0.12	89,267
37	3050208	60	1,117	2.16	30,138	58.32	0	0.00	4,705	9.10	257	0.50	15,440	29.88	20	0.04	0	0.00	51,676
38	3050208	80	287	0.39	27,608	37.94	0	0.00	28,685	39.42	59	0.08	14,995	20.61	0	0.00	1,137	1.56	72,770
39	3050208	120	1,077	1.86	14,323	24.79	2,530	4.38	14,125	24.45	10	0.02	24,988	43.25	0	0.00	722	1.25	57,775
40	3050208	130	1,463	1.52	9,153	9.53	3,410	3.55	40,833	42.53	2,501	2.60	25,383	26.44	12,978	13.52	287	0.30	96,009
41	3050208	140	385	1.27	2,511	8.29	0	0.00	11,644	38.43	2,026	6.69	959	3.16	12,642	41.73	128	0.42	30,296
42	3050208	110	6,356	9.03	4,053	5.76	0	0.00	12,217	17.35	8,352	11.86	14,787	21.00	23,258	33.03	1,384	1.97	70,408
43	3050208	90	6,079	2.52	51,449	21.32	1,394	0.58	83,534	34.62	16,349	6.78	36,217	15.01	44,500	18.44	1,769	0.73	241,291
44	3050208	100	13,759	9.17	27,400	18.28	0	0.00	17,090	11.40	17,209	11.48	9,796	6.53	63,805	42.57	850	0.57	149,899
45	3050208	10	2,867	1.31	43,690	19.91	484	0.22	76,042	34.65	9,568	4.36	38,836	17.70	46,833	21.34	1,156	0.53	219,476
46	3050208	40	30	0.05	6,366	11.41	287	0.51	12,158	21.80	3,064	5.49	12,217	21.90	21,657	38.83	0	0.00	55,778
47	3050208	20	5,496	5.32	26,659	25.80	0	0.00	45,489	44.03	297	0.29	22,893	22.16	850	0.82	1,641	1.59	103,323
48	3050208	30	425	0.44	20,303	20.84	405	0.42	47,436	48.70	119	0.12	26,748	27.46	1,967	2.02	10	0.01	97,412
49	3050208	70	1,730	2.60	21,094	31.76	30	0.04	29,189	43.94	30	0.04	13,700	20.63	99	0.15	554	0.83	66,424
50	3050207	10	1,295	2.47	18,593	35.49	59	0.11	26,402	50.40	652	1.25	5,268	10.06	0	0.00	119	0.23	52,388
51	3050207	20	1,245	7.45	8,886	53.13	0	0.00	4,003	23.94	148	0.89	2,441	14.60	0	0.00	0	0.00	16,725
52	3050207	30	662	0.59	55,699	49.80	306	0.27	34,240	30.61	227	0.20	20,639	18.45	69	0.06	10	0.01	111,853

WATERSHED #	CAT #	UNIT #	URBAN (ACRES)	%	AGRICULTURE (ACRES)	%	PASTURELAND (ACRES)	%	FOREST (ACRES)	%	WATER (ACRES)	%	FORESTED WETLANDS (ACRES)	%	UNFORESTED WETLANDS (ACRES)	%	BARE (ACRES)	%	TOTAL (ACRES)
53	3050207	50	1,888	1.93	57,755	59.18	138	0.14	22,991	23.56	306	0.31	14,323	14.68	0	0.00	188	0.19	97,590
54	3050207	40	336	0.31	39,024	36.44	0	0.00	35,634	33.27	178	0.17	31,808	29.70	89	0.08	20	0.02	107,089
55	3050207	60	761	1.04	38,382	52.25	0	0.00	25,512	34.73	217	0.30	8,412	11.45	0	0.00	168	0.23	73,452
56	3050207	70	178	0.46	13,107	33.77	0	0.00	15,865	40.87	40	0.10	9,539	24.57	89	0.23	0	0.00	38,817
57	3050207	100	99	0.29	13,730	39.61	0	0.00	15,825	45.65	0	0.00	5,011	14.46	0	0.00	0	0.00	34,665
58	3050207	80	0	0.00	15,647	36.25	0	0.00	17,940	41.56	0	0.00	9,578	22.19	0	0.00	0	0.00	43,166
59	3050207	90	257	0.50	15,222	29.57	0	0.00	32,747	63.61	69	0.13	3,183	6.18	0	0.00	0	0.00	51,479
60	3050207	110	0	0.00	16,735	35.36	0	0.00	12,356	26.11	0	0.00	18,178	38.41	0	0.00	59	0.13	47,327
61	3050204	20	3,212	3.34	30,978	32.21	0	0.00	49,818	51.79	148	0.15	7,967	8.28	0	0.00	4,063	4.22	96,186
62	3050204	10	1,216	0.85	39,795	27.97	0	0.00	87,745	61.67	326	0.23	11,120	7.82	30	0.02	2,056	1.44	142,288
63	3050204	30	959	1.22	28,823	36.74	79	0.10	36,968	47.12	138	0.18	11,486	14.64	0	0.00	0	0.00	78,454
64	3050204	40	1,147	2.83	16,764	41.44	0	0.00	16,596	41.02	59	0.15	5,891	14.56	0	0.00	0	0.00	40,457
65	3050204	60	59	0.23	15,548	59.45	0	0.00	6,030	23.05	0	0.00	4,517	17.27	0	0.00	0	0.00	26,154
66	3050204	70	59	0.25	13,463	56.42	0	0.00	5,466	22.91	217	0.91	4,656	19.51	0	0.00	0	0.00	23,861
67	3050204	50	4,339	2.53	93,369	54.44	0	0.00	48,948	28.54	178	0.10	24,672	14.39	0	0.00	0	0.00	171,507
68	3050203	10	633	1.16	13,394	24.49	751	1.37	37,423	68.43	316	0.58	2,165	3.96	0	0.00	10	0.02	54,691
69	3050203	30	385	0.93	8,649	20.84	0	0.00	29,891	72.02	128	0.31	2,412	5.81	0	0.00	40	0.10	41,505
70	3050203	20	692	1.09	14,422	22.63	40	0.06	43,363	68.06	474	0.74	4,547	7.14	0	0.00	178	0.28	63,716
71	3050203	40	2,679	2.19	50,381	41.13	0	0.00	59,979	48.97	148	0.12	9,153	7.47	0	0.00	148	0.12	122,489
72	3050203	50	731	1.32	24,405	44.15	0	0.00	26,698	48.30	138	0.25	3,163	5.72	0	0.00	138	0.25	55,274
73	3050203	60	1,473	2.57	23,802	41.55	0	0.00	22,922	40.01	257	0.45	8,837	15.42	0	0.00	0	0.00	57,291
74	3050203	70	5,189	10.13	17,328	33.82	0	0.00	25,838	50.43	435	0.85	2,115	4.13	0	0.00	326	0.64	51,232
75	3050203	80	4,418	7.50	22,458	38.13	0	0.00	16,112	27.36	59	0.10	15,845	26.91	0	0.00	0	0.00	58,892
76	3050205	10	593	0.64	17,417	18.90	0	0.00	45,587	49.47	148	0.16	28,388	30.81	20	0.02	0	0.00	92,154
77	3050205	20	0	0.00	12,573	34.28	0	0.00	7,710	21.02	0	0.00	16,398	44.70	0	0.00	0	0.00	36,682
78	3050205	30	128	0.29	6,969	15.90	0	0.00	24,543	55.99	89	0.20	11,328	25.84	208	0.47	573	1.31	43,838
79	3050205	40	1,048	1.02	37,868	37.00	0	0.00	50,293	49.15	0	0.00	12,267	11.99	0	0.00	860	0.84	102,335
80	3050205	50	0	0.00	1,344	9.48	0	0.00	8,590	60.56	0	0.00	4,250	29.97	0	0.00	0	0.00	14,184
81	3050205	60	1,236	0.79	17,940	11.54	79	0.05	56,846	36.55	8,155	5.24	41,090	26.42	29,426	18.92	741	0.48	155,513
82	3050205	70	1,868	1.73	35,703	33.00	148	0.14	22,220	20.54	9,707	8.97	6,801	6.29	31,077	28.73	652	0.60	108,176
83	3050206	10	1,819	3.34	32,392	59.54	0	0.00	10,824	19.89	306	0.56	9,064	16.66	0	0.00	0	0.00	54,405
84	3050206	20	2,649	3.82	36,098	52.11	0	0.00	18,089	26.11	208	0.30	12,168	17.57	0	0.00	59	0.09	69,271
85	3050206	30	1,245	2.45	23,842	46.85	0	0.00	21,736	42.72	49	0.10	4,013	7.89	0	0.00	0	0.00	50,886
86	3050206	40	2,066	3.14	21,173	32.20	0	0.00	20,204	30.72	168	0.26	21,084	32.06	0	0.00	1,068	1.62	65,762
87	3050206	50	0	0.00	13,295	65.42	0	0.00	4,250	20.91	49	0.24	2,283	11.24	0	0.00	445	2.19	20,323
88	3050206	55	109	0.79	8,728	63.39	0	0.00	4,606	33.45	0	0.00	148	1.08	0	0.00	178	1.29	13,769
89	3050206	60	168	0.24	22,804	32.02	0	0.00	37,611	52.82	40	0.06	10,547	14.81	0	0.00	40	0.06	71,208
90	3050206	70	1,957	2.13	18,227	19.87	405	0.44	51,498	56.13	277	0.30	19,216	20.94	0	0.00	168	0.18	91,748
91	3050202	10	899	0.99	11,229	12.37	959	1.06	64,704	71.30	119	0.13	12,613	13.90	0	0.00	227	0.25	90,750
92	3050202	20	4,774	6.76	11,654	16.51	0	0.00	39,261	55.63	712	1.01	12,484	17.69	59	0.08	1,631	2.31	70,576
93	3050202	30	3,578	15.26	1,641	7.00	0	0.00	13,314	56.79	119	0.51	4,053	17.28	0	0.00	741	3.16	23,446
94	3050202	40	14,659	31.57	880	1.89	0	0.00	18,613	40.08	3,341	7.19	3,025	6.51	4,715	10.15	1,206	2.60	46,438
95	3050202	50	7,670	5.25	13,285	9.09	178	0.12	55,225	37.77	2,016	1.38	56,500	38.64	10,547	7.21	791	0.54	146,212
96	3050202	60	2,886	2.76	4,191	4.00	0	0.00	27,914	26.66	12,000	11.46	5,862	5.60	50,727	48.46	1,107	1.06	104,687
97	3050202	70	5,308	9.00	12,712	21.56	0	0.00	8,105	13.74	4,112	6.97	6,178	10.48	21,647	36.71	909	1.54	58,971
98	3050201	10	4,013	4.06	7,542	7.64	0	0.00	20,866	21.13	53,554	54.23	11,525	11.67	1,255	1.27	0	0.00	98,756
99	3050201	20	297	0.41	8,936	12.31	0	0.00	40,566	55.88	49	0.07	22,616	31.15	128	0.18	0	0.00	72,592
100	3050201	30	899	1.99	5,911	13.09	0	0.00	28,813	63.80	1,819	4.03	366	0.81	6,909	15.30	445	0.98	45,162
101	3050201	40	425	0.41	2,382	2.27	0	0.00	81,785	78.03	208	0.20	14,085	13.44	5,476	5.22	455	0.43	104,816
102	3050201	50	8,214	16.74	3,025	6.16	0	0.00	22,102	45.04	3,311	6.75	49	0.10	11,960	24.38	405	0.83	49,067
103	3050201	60	3,717	7.16	2,787	5.37	0	0.00	33,143	63.84	1,295	2.49	4,616	8.89	5,140	9.90	1,216	2.34	51,914
104	3050201	70	12,286	30.33	731	1.81	0	0.00	18,662	46.07	1,493	3.68	3,578	8.83	3,232	7.98	524	1.29	40,507

WATERSHED #	CAT #	UNIT #	URBAN (ACRES)	%	AGRICULTURE (ACRES)	%	PASTURELAND (ACRES)	%	FOREST (ACRES)	%	WATER (ACRES)	%	FORESTED WETLANDS (ACRES)	%	UNFORESTED WETLANDS (ACRES)	%	BARE (ACRES)	%	TOTAL (ACRES)
105	3050201	80	2,402	3.65	6,919	10.52	0	0.00	39,172	59.54	4,517	6.87	2,096	3.19	10,685	16.24	0	0.00	65,791
106	3050109	10	1,077	2.27	6,257	13.16	0	0.00	39,192	82.42	1,028	2.16	0	0.00	0	0.00	0	0.00	47,555
107	3050109	20	2,135	2.45	7,937	9.12	0	0.00	76,012	87.39	484	0.56	0	0.00	0	0.00	415	0.48	86,984
108	3050109	30	0	0.00	4,369	15.00	0	0.00	24,761	85.00	0	0.00	0	0.00	0	0.00	0	0.00	29,130
109	3050109	40	19,057	20.12	28,112	29.67	0	0.00	45,093	47.60	425	0.45	0	0.00	0	0.00	2,046	2.16	94,733
110	3050109	50	4,517	21.10	6,425	30.01	0	0.00	10,260	47.92	69	0.32	0	0.00	0	0.00	138	0.65	21,410
111	3050109	60	4,072	15.88	11,970	46.67	0	0.00	9,558	37.26	0	0.00	0	0.00	0	0.00	49	0.19	25,650
112	3050109	70	2,343	20.36	4,725	41.07	0	0.00	4,181	36.34	257	2.23	0	0.00	0	0.00	0	0.00	11,506
113	3050109	80	7,404	4.15	40,873	22.90	0	0.00	121,016	67.81	9,064	5.08	0	0.00	0	0.00	119	0.07	178,475
114	3050109	90	1,720	5.88	15,776	53.97	0	0.00	11,674	39.94	0	0.00	0	0.00	0	0.00	59	0.20	29,229
115	3050109	100	38,194	51.76	12,089	16.38	0	0.00	22,220	30.11	99	0.13	0	0.00	0	0.00	1,186	1.61	73,788
116	3050109	110	1,908	7.66	14,105	56.67	0	0.00	8,580	34.47	297	1.19	0	0.00	0	0.00	0	0.00	24,889
117	3050109	120	642	0.95	22,893	33.88	0	0.00	43,334	64.14	692	1.02	0	0.00	0	0.00	0	0.00	67,561
118	3050109	130	2,115	2.36	37,275	41.65	0	0.00	50,115	55.99	0	0.00	0	0.00	0	0.00	0	0.00	89,505
119	3050109	140	13,769	13.48	23,159	22.67	0	0.00	65,090	63.70	119	0.12	0	0.00	0	0.00	40	0.04	102,176
120	3050109	150	5,288	3.11	62,253	36.67	0	0.00	99,636	58.68	2,096	1.23	0	0.00	0	0.00	514	0.30	169,787
121	3050109	160	6,662	8.32	26,738	33.38	0	0.00	46,704	58.30	0	0.00	0	0.00	0	0.00	0	0.00	80,104
122	3050109	163	336	0.46	22,902	31.44	0	0.00	49,472	67.92	0	0.00	0	0.00	0	0.00	128	0.18	72,839
123	3050109	170	1,759	1.15	69,854	45.84	119	0.08	78,641	51.61	1,572	1.03	326	0.21	0	0.00	119	0.08	152,390
124	3050109	180	3,924	5.71	24,099	35.09	0	0.00	36,731	53.49	99	0.14	3,717	5.41	69	0.10	30	0.04	68,668
125	3050109	190	7,819	4.83	32,975	20.39	0	0.00	81,903	50.64	37,057	22.91	0	0.00	0	0.00	1,997	1.23	161,751
126	3050109	200	128	0.94	4,171	30.54	0	0.00	9,341	68.38	20	0.14	0	0.00	0	0.00	0	0.00	13,660
127	3050109	210	20,609	32.94	8,689	13.89	0	0.00	31,383	50.17	1,364	2.18	0	0.00	0	0.00	514	0.82	62,559
128	3050108	10	30,939	18.11	73,363	42.94	0	0.00	65,277	38.21	148	0.09	0	0.00	0	0.00	1,117	0.65	170,844
129	3050108	20	2,441	3.37	10,705	14.79	0	0.00	59,070	81.62	0	0.00	0	0.00	0	0.00	158	0.22	72,375
130	3050108	30	1,077	3.05	16,982	48.03	0	0.00	16,922	47.86	227	0.64	0	0.00	0	0.00	148	0.42	35,357
131	3050108	40	5,328	7.76	16,942	24.68	0	0.00	46,072	67.10	227	0.33	0	0.00	0	0.00	89	0.13	68,658
132	3050108	43	801	3.25	2,511	10.20	0	0.00	21,291	86.54	0	0.00	0	0.00	0	0.00	0	0.00	24,603
133	3050108	50	4,646	3.87	17,446	14.53	0	0.00	97,798	81.46	89	0.07	0	0.00	0	0.00	79	0.07	120,058
134	3050107	10	11,357	9.84	49,215	42.64	0	0.00	53,999	46.78	583	0.51	0	0.00	0	0.00	267	0.23	115,422
135	3050107	20	4,033	15.17	9,934	37.36	0	0.00	11,743	44.16	435	1.64	0	0.00	0	0.00	445	1.67	26,589
136	3050107	30	4,409	16.62	8,145	30.70	0	0.00	13,947	52.57	0	0.00	0	0.00	0	0.00	30	0.11	26,530
137	3050107	40	5,516	8.37	28,893	43.82	0	0.00	30,899	46.87	425	0.64	0	0.00	0	0.00	198	0.30	65,930
138	3050107	50	1,305	0.85	29,258	19.03	0	0.00	122,806	79.86	415	0.27	0	0.00	0	0.00	0	0.00	153,784
139	3050107	60	19,186	12.26	34,082	21.77	0	0.00	102,473	65.47	366	0.23	0	0.00	0	0.00	415	0.27	156,522
140	3050105	155	1,315	4.29	15,163	49.48	0	0.00	14,135	46.13	30	0.10	0	0.00	0	0.00	0	0.00	30,642
141	3050105	160	3,815	6.37	31,472	52.54	0	0.00	22,794	38.05	1,631	2.72	0	0.00	0	0.00	188	0.31	59,900
142	3050105	180	20,876	34.82	21,529	35.91	0	0.00	16,992	28.34	30	0.05	0	0.00	0	0.00	524	0.87	59,950
143	3050105	170	5,713	6.74	42,998	50.75	0	0.00	35,891	42.36	109	0.13	0	0.00	0	0.00	10	0.01	84,720
144	3050105	58	30	0.49	3,914	64.39	0	0.00	2,135	35.12	0	0.00	0	0.00	0	0.00	0	0.00	6,079
145	3050105	94	1,591	1.69	23,921	25.47	0	0.00	65,960	70.22	2,362	2.51	99	0.11	0	0.00	0	0.00	93,933
146	3050105	110	1,374	9.11	9,153	60.68	0	0.00	4,250	28.18	306	2.03	0	0.00	0	0.00	0	0.00	15,084
147	3050105	130	5,436	5.47	30,504	30.68	0	0.00	62,727	63.08	385	0.39	287	0.29	0	0.00	99	0.10	99,438
148	3050105	109	1,700	11.18	4,211	27.68	0	0.00	8,975	59.00	0	0.00	109	0.71	0	0.00	217	1.43	15,212
149	3050105	122	138	0.52	3,005	11.26	0	0.00	23,476	87.96	0	0.00	0	0.00	0	0.00	69	0.26	26,688
150	3050105	142	474	0.61	20,105	26.00	0	0.00	56,708	73.33	49	0.06	0	0.00	0	0.00	0	0.00	77,337
151	3050105	190	2,590	3.20	25,275	31.21	0	0.00	52,793	65.20	217	0.27	0	0.00	0	0.00	99	0.12	80,974
152	3050101	190	3,825	7.95	11,990	24.93	0	0.00	27,746	57.69	3,430	7.13	0	0.00	0	0.00	1,107	2.30	48,098
153	3050101	200	1,245	3.06	16,725	41.04	0	0.00	21,924	53.80	603	1.48	0	0.00	0	0.00	257	0.63	40,754
154	3050106	10	761	0.94	10,270	12.64	0	0.00	67,432	83.02	2,758	3.40	0	0.00	0	0.00	0	0.00	81,221
155	3050106	20	850	0.87	23,812	24.40	0	0.00	72,908	74.72	0	0.00	0	0.00	0	0.00	0	0.00	97,570
156	3050106	30	1,888	5.35	6,583	18.66	0	0.00	26,520	75.15	119	0.34	0	0.00	0	0.00	178	0.50	35,288

WATERSHED #	CAT #	UNIT #	URBAN (ACRES)	%	AGRICULTURE (ACRES)	%	PASTURELAND (ACRES)	%	FOREST (ACRES)	%	WATER (ACRES)	%	FORESTED WETLANDS (ACRES)	%	UNFORESTED WETLANDS (ACRES)	%	BARE (ACRES)	%	TOTAL (ACRES)
157	3050106	40	4,418	4.28	12,553	12.15	0	0.00	85,936	83.18	405	0.39	0	0.00	0	0.00	0	0.00	103,313
158	3050106	50	2,847	1.81	23,594	14.96	0	0.00	119,949	76.08	10,003	6.34	0	0.00	702	0.45	573	0.36	157,668
159	3050106	60	30,998	19.12	12,969	8.00	10	0.01	113,040	69.72	3,311	2.04	0	0.00	0	0.00	1,799	1.11	162,126
160	3050106	70	435	0.36	10,428	8.63	0	0.00	109,560	90.67	119	0.10	0	0.00	0	0.00	297	0.25	120,838
161	3050106	80	2,857	7.24	6,692	16.95	0	0.00	29,505	74.76	188	0.48	0	0.00	0	0.00	227	0.58	39,469
162	3050106	90	1,463	2.36	5,950	9.61	0	0.00	54,493	87.98	0	0.00	0	0.00	0	0.00	30	0.05	61,937
163	3050103	10	15,578	15.70	11,733	11.82	0	0.00	67,333	67.84	4,003	4.03	0	0.00	0	0.00	603	0.61	99,251
164	3050103	28	2,254	7.79	7,888	27.27	0	0.00	18,395	63.60	178	0.62	0	0.00	0	0.00	208	0.72	28,922
165	3050103	38	119	0.48	7,700	31.31	0	0.00	16,715	67.97	0	0.00	10	0.04	0	0.00	49	0.20	24,593
166	3050103	50	465	1.69	15,459	56.12	0	0.00	11,496	41.73	128	0.47	0	0.00	0	0.00	0	0.00	27,548
167	3050103	60	11,604	8.04	59,030	40.88	0	0.00	70,141	48.57	1,957	1.36	0	0.00	0	0.00	1,670	1.16	144,403
168	3050103	70	524	3.33	5,476	34.80	0	0.00	9,301	59.11	59	0.38	0	0.00	0	0.00	376	2.39	15,736
169	3050103	90	4,695	3.34	35,950	25.55	0	0.00	98,727	70.16	356	0.25	0	0.00	0	0.00	998	0.71	140,726
170	3050103	42	12,731	9.73	37,196	28.42	0	0.00	79,155	60.48	1,206	0.92	0	0.00	0	0.00	593	0.45	130,881
171	3050103	80	148	0.66	4,082	18.19	0	0.00	18,148	80.88	0	0.00	0	0.00	0	0.00	59	0.26	22,438
172	3050104	10	5,417	2.88	13,216	7.03	0	0.00	157,886	84.00	10,596	5.64	227	0.12	0	0.00	623	0.33	187,964
173	3050104	20	188	0.48	5,219	13.22	0	0.00	33,024	83.67	247	0.63	287	0.73	0	0.00	504	1.28	39,469
174	3050104	30	10,240	4.40	58,210	25.00	0	0.00	89,495	38.43	781	0.34	73,155	31.42	0	0.00	979	0.42	232,860
175	3050104	40	267	0.59	7,463	16.54	0	0.00	37,383	82.87	0	0.00	0	0.00	0	0.00	0	0.00	45,113
176	3050104	50	30	0.08	7,423	18.80	0	0.00	31,957	80.93	79	0.20	0	0.00	0	0.00	0	0.00	39,489
177	3050104	60	3,717	4.65	15,054	18.84	731	0.92	56,055	70.17	257	0.32	3,104	3.89	0	0.00	969	1.21	79,887
178	3050104	70	2,501	5.73	15,044	34.45	0	0.00	24,800	56.79	326	0.75	939	2.15	0	0.00	59	0.14	43,670
179	3050104	80	544	1.25	20,342	46.84	0	0.00	15,015	34.57	109	0.25	6,623	15.25	0	0.00	801	1.84	43,433
180	3050104	90	1,354	2.65	5,822	11.39	0	0.00	29,584	57.89	297	0.58	13,749	26.91	0	0.00	297	0.58	51,103
181	3050104	100	395	0.82	1,878	3.90	0	0.00	43,739	90.94	277	0.58	1,799	3.74	0	0.00	10	0.02	48,098
182	3050110	10	13,532	9.44	22,131	15.43	0	0.00	79,699	55.57	3,796	2.65	23,150	16.14	0	0.00	1,107	0.77	143,415
183	3050110	20	11,199	11.03	9,123	8.98	0	0.00	73,195	72.08	860	0.85	4,883	4.81	0	0.00	2,283	2.25	101,544
184	3050110	30	15,894	33.63	4,132	8.74	0	0.00	22,754	48.14	840	1.78	2,125	4.50	0	0.00	1,522	3.22	47,268
185	3050110	40	474	1.41	5,634	16.80	0	0.00	27,034	80.61	208	0.62	188	0.56	0	0.00	0	0.00	33,538
186	3050110	50	2,570	3.90	20,006	30.39	0	0.00	28,171	42.79	830	1.26	14,214	21.59	0	0.00	40	0.06	65,831
187	3050110	60	425	1.15	12,889	35.03	158	0.43	17,278	46.95	287	0.78	5,763	15.66	0	0.00	0	0.00	36,800
188	3050110	70	0	0.00	17,970	37.00	0	0.00	19,255	39.65	1,364	2.81	9,707	19.99	267	0.55	0	0.00	48,563
189	3050111	10	4,329	2.10	49,788	24.13	0	0.00	55,877	27.08	68,816	33.35	26,688	12.93	257	0.12	573	0.28	206,330
190	3050111	20	672	1.09	32,520	52.94	0	0.00	22,725	36.99	1,384	2.25	4,063	6.61	69	0.11	0	0.00	61,432
191	3050111	29	59	0.62	7,324	76.39	0	0.00	2,204	22.99	0	0.00	0	0.00	0	0.00	0	0.00	9,588
192	3050111	30	702	2.35	19,265	64.52	0	0.00	8,481	28.40	633	2.12	731	2.45	49	0.17	0	0.00	29,861
193	3050111	40	969	4.44	12,534	57.43	0	0.00	6,801	31.16	1,176	5.39	316	1.45	0	0.00	30	0.14	21,825
194	3050111	50	1,196	3.21	14,224	38.23	0	0.00	14,402	38.71	5,288	14.21	1,878	5.05	0	0.00	217	0.58	37,205
195	3050112	10	870	0.76	19,848	17.41	811	0.71	46,121	40.46	99	0.09	44,382	38.94	811	0.71	1,038	0.91	113,979
196	3050112	20	1,552	4.46	10,665	30.63	455	1.31	10,448	30.00	69	0.20	11,219	32.22	415	1.19	0	0.00	34,823
197	3050112	30	306	0.18	14,926	8.88	0	0.00	93,290	55.49	1,265	0.75	58,240	34.64	109	0.06	0	0.00	168,136
198	3050112	40	40	0.09	6,751	14.62	0	0.00	26,461	57.29	267	0.58	12,455	26.96	217	0.47	0	0.00	46,190
199	3050112	50	89	0.17	1,552	2.96	0	0.00	37,630	71.83	0	0.00	12,366	23.60	751	1.43	0	0.00	52,388
200	3050112	60	554	0.86	8,718	13.58	0	0.00	25,621	39.91	2,817	4.39	1,542	2.40	24,949	38.86	0	0.00	64,200
201	3040105	80	0	0.00	1,334	74.18	0	0.00	465	25.82	0	0.00	0	0.00	0	0.00	0	0.00	1,799
202	3040104	60	247	5.48	2,807	62.28	0	0.00	1,453	32.24	0	0.00	0	0.00	0	0.00	0	0.00	4,507
203	3040202	15	69	0.39	8,619	48.50	0	0.00	9,084	51.11	0	0.00	0	0.00	0	0.00	0	0.00	17,772
204	3040202	20	1,137	11.30	4,725	46.95	0	0.00	4,122	40.96	79	0.79	0	0.00	0	0.00	0	0.00	10,062
205	3040202	50	929	3.04	17,634	57.68	0	0.00	12,010	39.28	0	0.00	0	0.00	0	0.00	0	0.00	30,573
206	3040202	30	0	0.00	11,229	29.46	0	0.00	26,757	70.20	0	0.00	0	0.00	0	0.00	128	0.34	38,115
207	3040202	40	0	0.00	7,779	25.59	0	0.00	22,626	74.41	0	0.00	0	0.00	0	0.00	0	0.00	30,405
208	3040202	70	2,086	2.61	21,015	26.31	0	0.00	56,589	70.84	40	0.05	158	0.20	0	0.00	0	0.00	79,887

WATERSHED #	CAT #	UNIT #	URBAN (ACRES)	%	AGRICULTURE (ACRES)	%	PASTURELAND (ACRES)	%	FOREST (ACRES)	%	WATER (ACRES)	%	FORESTED WETLANDS (ACRES)	%	UNFORESTED WETLANDS (ACRES)	%	BARE (ACRES)	%	TOTAL (ACRES)
209	3040202	60	1,493	1.21	49,769	40.24	0	0.00	70,556	57.05	89	0.07	1,720	1.39	0	0.00	49	0.04	123,675
210	3040202	80	237	0.46	12,830	25.00	0	0.00	34,280	66.81	0	0.00	3,964	7.72	0	0.00	0	0.00	51,311
211	3040202	90	1,848	1.60	54,573	47.34	0	0.00	48,691	42.24	138	0.12	9,835	8.53	0	0.00	188	0.16	115,273
212	3040202	97	336	3.22	6,455	61.84	0	0.00	3,647	34.94	0	0.00	0	0.00	0	0.00	0	0.00	10,438
213	3040202	100	2,619	2.35	74,312	66.77	0	0.00	23,654	21.25	40	0.04	10,675	9.59	0	0.00	0	0.00	111,300
214	3040202	110	514	1.29	22,715	56.97	0	0.00	13,028	32.67	0	0.00	3,499	8.78	0	0.00	119	0.30	39,874
215	3040202	140	969	6.07	8,926	55.95	0	0.00	5,377	33.71	0	0.00	623	3.90	0	0.00	59	0.37	15,954
216	3040202	150	1,947	5.42	17,308	48.16	0	0.00	12,375	34.43	20	0.06	4,171	11.61	0	0.00	119	0.33	35,940
217	3040202	120	1,572	1.51	37,275	35.79	0	0.00	52,220	50.15	247	0.24	12,662	12.16	0	0.00	158	0.15	104,134
218	3040202	160	761	2.20	15,252	44.16	0	0.00	13,987	40.50	10	0.03	4,488	12.99	0	0.00	40	0.11	34,537
219	3040202	170	563	1.72	15,578	47.50	0	0.00	12,850	39.18	49	0.15	3,756	11.45	0	0.00	0	0.00	32,797
220	3040202	130	801	1.97	15,973	39.32	0	0.00	20,056	49.37	49	0.12	3,746	9.22	0	0.00	0	0.00	40,625
221	3040205	30	1,275	1.77	39,192	54.43	0	0.00	25,720	35.72	59	0.08	5,763	8.00	0	0.00	0	0.00	72,009
222	3040205	40	0	0.00	8,530	64.55	0	0.00	2,560	19.37	69	0.52	2,056	15.56	0	0.00	0	0.00	13,216
223	3040205	10	1,226	2.04	46,141	76.89	0	0.00	5,140	8.57	0	0.00	7,502	12.50	0	0.00	0	0.00	60,009
224	3040205	20	10	0.10	5,733	59.92	0	0.00	3,697	38.64	0	0.00	128	1.34	0	0.00	0	0.00	9,568
225	3040205	60	2,323	3.89	39,509	66.09	0	0.00	8,995	15.05	168	0.28	8,669	14.50	0	0.00	119	0.20	59,782
226	3040205	50	544	1.88	16,853	58.35	0	0.00	3,558	12.32	0	0.00	7,888	27.31	0	0.00	40	0.14	28,883
227	3040205	80	14,254	14.24	37,947	37.92	0	0.00	40,289	40.26	1,404	1.40	5,516	5.51	40	0.04	613	0.61	100,061
228	3040205	90	3,707	2.12	84,365	48.18	0	0.00	61,432	35.08	415	0.24	24,395	13.93	0	0.00	791	0.45	175,105
229	3040205	70	1,166	1.40	32,421	38.89	237	0.28	30,761	36.89	109	0.13	17,525	21.02	554	0.66	603	0.72	83,376
230	3040205	110	1,552	1.28	53,238	43.97	0	0.00	50,678	41.86	59	0.05	12,830	10.60	0	0.00	2,718	2.25	121,076
231	3040205	100	0	0.00	5,773	23.29	0	0.00	11,822	47.71	69	0.28	5,684	22.94	0	0.00	1,433	5.78	24,781
232	3040205	120	484	1.20	15,123	37.35	0	0.00	16,398	40.50	10	0.02	8,441	20.85	0	0.00	30	0.07	40,487
233	3040205	130	3,025	6.03	22,487	44.83	0	0.00	21,202	42.27	49	0.10	3,242	6.46	0	0.00	158	0.32	50,164
234	3040205	140	1,878	1.26	59,129	39.70	69	0.05	65,772	44.16	109	0.07	21,865	14.68	0	0.00	109	0.07	148,930
235	3040205	160	593	0.70	33,084	39.11	0	0.00	38,154	45.11	30	0.04	12,721	15.04	0	0.00	0	0.00	84,582
236	3040205	150	2,224	1.90	25,472	21.74	0	0.00	66,207	56.50	89	0.08	22,991	19.62	188	0.16	0	0.00	117,171
237	3040205	170	217	0.26	17,891	21.27	0	0.00	54,760	65.10	148	0.18	11,061	13.15	20	0.02	20	0.02	84,117
238	3040205	180	1,196	1.35	7,077	7.97	0	0.00	56,876	64.07	2,550	2.87	13,710	15.44	7,324	8.25	40	0.04	88,773
239	3040207	40	5,259	4.88	8,056	7.47	0	0.00	71,673	66.50	949	0.88	15,707	14.57	5,812	5.39	326	0.30	107,781
240	3040207	50	178	0.36	1,947	3.97	0	0.00	25,057	51.15	1,364	2.78	4,418	9.02	16,023	32.71	0	0.00	48,988
241	3040207	30	9,924	29.74	2,283	6.84	0	0.00	14,530	43.54	1,226	3.67	969	2.90	3,321	9.95	1,117	3.35	33,370
242	3040201	62	2,422	1.31	74,144	39.98	0	0.00	105,349	56.81	563	0.30	2,530	1.36	0	0.00	445	0.24	185,454
243	3040201	100	870	0.76	38,886	33.92	0	0.00	72,246	63.02	2,105	1.84	0	0.00	0	0.00	524	0.46	114,631
244	3040201	80	504	1.02	14,441	29.24	0	0.00	34,121	69.10	119	0.24	198	0.40	0	0.00	0	0.00	49,383
245	3040201	33	0	0.00	9,114	55.31	0	0.00	7,245	43.97	30	0.18	0	0.00	0	0.00	89	0.54	16,478
246	3040201	29	0	0.00	1,809	37.73	0	0.00	2,521	52.58	465	9.69	0	0.00	0	0.00	0	0.00	4,794
247	3040201	19	0	0.00	2,076	35.35	0	0.00	3,766	64.14	30	0.51	0	0.00	0	0.00	0	0.00	5,871
248	3040201	41	0	0.00	2,372	13.11	0	0.00	15,618	86.34	99	0.55	0	0.00	0	0.00	0	0.00	18,089
249	3040201	50	3,885	1.64	63,973	27.04	0	0.00	134,400	56.80	4,754	2.01	28,033	11.85	0	0.00	1,572	0.66	236,616
250	3040201	72	2,689	6.03	25,196	56.47	0	0.00	12,978	29.09	662	1.48	1,839	4.12	49	0.11	1,206	2.70	44,619
251	3040201	97	138	2.04	4,003	59.12	0	0.00	2,629	38.83	0	0.00	0	0.00	0	0.00	0	0.00	6,771
252	3040201	70	781	1.07	41,545	56.71	0	0.00	29,515	40.29	178	0.24	860	1.17	0	0.00	385	0.53	73,264
253	3040201	110	16,250	7.83	105,794	51.00	0	0.00	80,608	38.86	583	0.28	3,331	1.61	89	0.04	781	0.38	207,437
254	3040201	130	10,181	6.97	61,986	42.46	0	0.00	70,378	48.21	544	0.37	2,165	1.48	208	0.14	514	0.35	145,975
255	3040201	120	514	0.56	16,547	17.95	0	0.00	42,484	46.09	1,572	1.70	30,514	33.10	474	0.51	79	0.09	92,183
256	3040201	150	3,183	2.94	46,378	42.91	0	0.00	45,459	42.06	217	0.20	12,820	11.86	0	0.00	20	0.02	108,078
257	3040201	140	227	0.35	11,802	18.18	0	0.00	33,746	51.98	1,670	2.57	17,476	26.92	0	0.00	0	0.00	64,922
258	3040201	160	3,311	3.21	23,911	23.21	0	0.00	42,296	41.05	49	0.05	33,469	32.48	0	0.00	0	0.00	103,036
259	3040201	170	899	1.10	5,031	6.18	0	0.00	37,196	45.67	4,221	5.18	21,726	26.67	12,267	15.06	109	0.13	81,449
260	3040204	15	603	2.28	16,576	62.76	0	0.00	8,441	31.96	158	0.60	633	2.40	0	0.00	0	0.00	26,411

WATERSHED #	CAT #	UNIT #	URBAN (ACRES)	%	AGRICULTURE (ACRES)	%	PASTURELAND (ACRES)	%	FOREST (ACRES)	%	WATER (ACRES)	%	FORESTED WETLANDS (ACRES)	%	UNFORESTED WETLANDS (ACRES)	%	BARE (ACRES)	%	TOTAL (ACRES)
261	3040204	50	2,748	2.56	53,742	50.16	0	0.00	38,510	35.94	168	0.16	11,970	11.17	0	0.00	0	0.00	107,139
262	3040204	38	277	5.28	3,469	66.23	0	0.00	929	17.74	0	0.00	563	10.75	0	0.00	0	0.00	5,239
263	3040204	30	3,143	3.49	40,635	45.11	0	0.00	23,169	25.72	158	0.18	22,428	24.90	0	0.00	554	0.61	90,088
264	3040204	49	0	0.00	1,048	54.08	0	0.00	474	24.49	0	0.00	415	21.43	0	0.00	0	0.00	1,937
265	3040204	60	257	1.97	6,247	47.88	0	0.00	1,493	11.44	79	0.61	4,932	37.80	40	0.30	0	0.00	13,048
266	3040204	70	4,754	2.28	51,568	24.74	0	0.00	85,659	41.09	1,611	0.77	63,943	30.67	781	0.37	138	0.07	208,455
267	3040204	90	395	0.79	20,807	41.40	0	0.00	20,421	40.63	40	0.08	8,580	17.07	0	0.00	20	0.04	50,263
268	3040204	80	1,048	0.99	44,510	42.20	0	0.00	42,266	40.07	188	0.18	17,229	16.33	0	0.00	237	0.22	105,478
269	3040204	88	0	0.00	10,527	36.22	0	0.00	9,529	32.79	20	0.07	8,985	30.92	0	0.00	0	0.00	29,061
270	3040203	215	336	0.91	17,950	48.69	0	0.00	13,631	36.97	128	0.35	4,824	13.08	0	0.00	0	0.00	36,869
271	3040203	220	356	0.67	15,618	29.54	0	0.00	16.566	31.33	40	0.07	19,947	37.73	208	0.39	138	0.26	52,872
272	3040206	66	257	2.55	4,557	45.28	0	0.00	4,082	40.57	0	0.00	1,166	11.59	0	0.00	0	0.00	10,062
273	3040206	100	40	0.16	7,018	28.49	0	0.00	11,901	48.31	0	0.00	5,674	23.03	0	0.00	0	0.00	24,632
274	3040206	110	79	0.24	13,878	42.40	0	0.00	14,283	43.64	0	0.00	4,488	13.71	0	0.00	0	0.00	32,728
275	3040206	120	4,774	5.63	32,332	38.13	0	0.00	35,130	41.43	227	0.27	12,118	14.29	0	0.00	217	0.26	84,799
276	3040206	91	969	2.60	8,501	22.82	0	0.00	18,039	48.43	10	0.03	9,637	25.88	0	0.00	89	0.24	37,245
277	3040206	130	1,394	1.97	6,049	8.56	0	0.00	24,306	34.39	119	0.17	37,976	53.73	0	0.00	830	1.17	70,674
278	3040206	140	8,698	8.37	10,972	10.56	0	0.00	49,462	47.62	988	0.95	32,184	30.99	237	0.23	1,325	1.28	103,867
279	3040206	150	3,786	9.48	850	2.13	0	0.00	22,151	55.48	1,473	3.69	3,697	9.26	7,265	18.20	702	1.76	39,924
280	3040206	29	0	0.00	119	25.53	0	0.00	0	0.00	0	0.00	346	74.47	0	0.00	0	0.00	465
		TOTAL	897,892	4.39	5,761,955	28.17	16,240	0.08	10,569,617	51.67	500,602	2.45	2,075,130	10.14	521,558	2.55	113,237	0.55	20,456,221

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